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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The British Nitrogen Outlook

THE central feature of the annual report of the British Sulphate of Ammonia Federation is the increase in the past year of 420,000 tons, or about 34 per cent., in the production of various forms of nitrogen (Chile nitrate contributing 190,700 tons and the other forms 229,000 to this total), and the increase in the total consumption of 289,300 tons, or 22 per cent., following on an increase of 54,000 tons, or 4⅓ per cent., in the previous season. The increase in production is considerably higher than the increase in consumption, but this is not so serious as it might at first seem. The increase in new producing plants may be expected gradually to decline, while the limits of consumption are very far from being in sight. The world production of by-product sulphate in 1926-7 was 303,200 metric tons, and in 1927-8 336,000 tons. The world production of synthetic sulphate in the corresponding years was 300,000 tons and 366,100 tons. The synthetic, therefore, exceeds the by-product article by nearly 30,000 tons. The total production of nitrogen has risen from 1,237,500 tons in 1926-7 to 1,657,300 tons in 1927-8. The consumption of manufactured nitrogen was 1,037,500 tons in 1926-7 and 1,210,700 in 1927-8; of Chilean nitrate of soda 275,200 tons in 1926-7 and 391,300 tons in 1927-8. The total consumption in these years was respectively 1,312,700 tons and 1,602,000 tons.

The increase in production and consumption of nitrogen products in the year under review is the largest that has ever taken place in a single year, and is equivalent to the total annual world output of twenty-five years ago. While the total consumption in Germany decreased slightly during the year, chiefly owing to the financial difficulties of farmers, a remarkable expansion in the use of nitrogen has taken place in other European countries, the United States, and the Far East. The continued popularity of sulphate of ammonia is evinced by a steady increase of about 13 per cent. in its use, and it is still the most widely used of nitrogen fertilisers. The expansion in the demand for other forms of synthetic nitrogen has been equal to about 22 per cent. In view of the market and other conditions, the chief nitrogen producers of the world have decided to maintain last year's level of prices. In sulphate of ammonia exports the United Kingdom has a considerable lead over the United States, the figures for last year being 251,640 tons and 140,679 tons respectively. Some very remarkable increases in foreign markets are noted. The quantity exported to Spain, Portugal, and the Canaries has increased in the last two years from 50,994 to 85,050 tons, to Java from 4,293 to 29,610 tons, to Japan from 37,667 to 100,915 tons, to China from 24,206 to 49,800 tons, to West Indies and Mauritius from 8,917 to 14,958 tons, to India and Ceylon from 4,500 to 11,291 tons, and to South Africa from 353 to 1,694 tons. The total consumption of sulphate of ammonia in India and Ceylon was about 30,000 tons, and practically the whole of the local production in India was consumed in India and Ceylon. As a result of successful experimental work, the Sudan has now begun to buy on a commercial scale.

On the subject of price the tables show a considerable decline in average to the latest quoted figure of £9 1s. 8d. The highest point in the preceding ten years was £23 15s. in 1919-20. There may be no prospect of an advance, but with the greater rationalisation of the industry it may be possible to prevent any further decline. Among other interesting items, we learn that Nitram's Farm Economics Division is on the way to raising the theory and practice of costing to the level of an exact science embracing all forms of farming economy. Among the new markets an encouraging sign is the interest shown in nitrogen in Australia, and especially in New Zealand.

Safeguarding

MR. W. J. U. WOOLCOCK, who was so closely associated with the passing of the Dyestuffs Act and the inclusion of fine chemicals within the Safeguarding of Industries Act, has started a series of articles in *The Times Trade Supplement* on the safeguarding of British industry. It is not surprising to find no sign in his preliminary survey of any advocacy of a general tariff system; it would have been a surprise, indeed, to find that objective present. The question to be discussed is the much more limited one of safeguarding special industries which can set up a special claim. To which, however, it may be at once retorted that if one makes out a claim to preferential treatment others will not be content without similar benefits, and the tendency would be to make safeguarding measures general.

Mr. Woolcock discusses, as we have heard him discuss before, the three forms of safeguarding known as subsidy, the licensing of imports, and Customs duties. Subsidy he dismisses for all practical purposes. The second method was applied to the dyestuffs industry and is still in force. If the present position of the industry is due to the Act, the experiment has been a success, but the protection afforded was definitely limited to ten years, and it has never been openly contended that it should become permanent. The third method applies to fine chemicals and other materials. Here the effects are not so clear as in the case of dyestuffs, and the range for diversity of opinion is much wider. We shall be interested to see how the treatment of the safeguarding problem develops, and what conclusions are reached on points relating to chemical interests.

Oil Separators for Ships

THE conference at the House of Commons on Tuesday afternoon on the subject of installing oil separators on ships for the purpose of preventing the fouling of harbours, damage to fisheries, and destruction of wild bird life, disclosed a sharp division of opinion between the M.P.'s and others present and the official shipping interests. From the technical point of view the chief interest lay in Dr. Hele-Shaw's exposition of the principles of mechanical oil separation, and his diagrams of the principal systems invented. His conclusion was emphatic that oil separators would make unnecessary the pumping of oil into the sea and so effect a considerable saving to the shipping companies. It was reported that oil separators had been installed by the Cunard, White Star, and other lines on several of their ships. As against this, it was urged by the shipping companies represented that international agreement was essential and that so far agreement had only been secured on fixing a minimum radius from land of fifty miles. It was strongly urged that the only effectual remedy for an admitted evil and nuisance was the prevention of the pumping of oil into the sea, and that if Great Britain, as the chief shipping nation, took action the case for similar action by other countries would be strengthened. These views prevailed, and the conference decided by a large majority to ask the Government to make the installation of oil separators compulsory.

Books Received

THE PROBLEM OF FERMENTATION. By M. Schoen. Translated by H. Lloyd Hind. London: Chapman and Hall, Ltd. Pp. 211. 21s.

CHEMICAL PUBLICATIONS: THEIR NATURE AND USE. By Melvin Guy Mellon. London: McGraw-Hill Publishing Co., Ltd. Pp. 250. 12s. 6d.

EDUCATION FOR INDUSTRY AND COMMERCE. Board of Education Educational Pamphlets, No. 64. London: H.M. Stationery Office. Pp. 104. 6d. paper. 1s. 6d. cloth.

The Calendar

Nov. 26	University of Birmingham Chemical Society: "Infra-red Absorption Spectra of Gases." Sir Robert Robertson.	University, Birmingham.
27	Sir John Cass Technical Institute: Lectures on Chemical Plant. VII.—Aluminium Plant. E. T. Painton. 7 p.m.	Jewry Street, Aldgate, London.
27	Society of Dyers and Colourists (Huddersfield Section): "Conditions in Scandinavia." W. E. Fearnsides.	Huddersfield.
27	Hull Chemical and Engineering Society: "Conveying." J. H. Lee. 7.45 p.m.	Grey Street, Park Street, Hull.
27	Royal Photographic Society: Scientific and Technical Group.	London.
27	Royal Institution: "Diamonds." Sir Wm. Bragg. 5.15 p.m.	21, Albemarle Street, London.
28	British Science Guild: Norman Lockyer Lecture. "The Culture Value of Natural History." Professor J. Arthur Thomson.	Goldsmiths' Hall, London.
28	Society of Chemical Industry: Informal Meeting. Display of Mr. J. M. Leonard's film of the recent Canadian-American Tour. 8 p.m.	Burlington House, Piccadilly, London.
29	Institute of Brewing (Yorkshire Section): "Aims of the Barley Research." H. Lloyd Hind.	Queen's Hotel, Leeds.
29	Chemical Society: Liversidge Lecture: "Physical Chemistry in the Service of Biology." Professor F. G. Donnan. 5.30 p.m.	Institution of Mechanical Engineers, London, S.W.1.
30	Oil and Colour Chemists' Association. Social Evening and Dance. 8 p.m.	Ye Mecca, Ludgate Hill, London.
Dec. 3	University of London, University College: "Chemical Engineering Education and Research in Great Britain." W. E. Gibbs. 5.15 p.m.	University College, London.
3	Society of Chemical Industry (London Section): "Scientific Aspects of Paint Technology." Dr. L. A. Jordan. 8 p.m.	Burlington House, Piccadilly, London.
5	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
6	Institute of Chemistry (Manchester Section): Annual Dinner and Dance.	Manchester.
6	Society of Dyers and Colourists (Midlands Section): "Water and its Purification for Textile Industries and Steam Plant." C. J. Carter. 7.30 p.m.	Leicester Technical College.
6 & 7	Institution of Chemical Engineers. Conference on Drying. 10.30 a.m.	Burlington House, Piccadilly, London.
7	Society of Chemical Industry (Manchester Section): "Colloid-Chemical Changes in Rubber and other Unsaturated Organic Compounds." Dr. Auer.	Manchester.
11	Society of Dyers and Colourists (Scottish Section): Ramsay Chemical Dinner.	Grosvenor Restaurant, Glasgow.
13	Society of Dyers and Colourists (Midlands Section): "A New Type of Dyestuff—The Hydroxy-haloquinones." Dr. C. Shaw. 7.30 p.m.	University College, Nottingham.
14	Oil and Colour Chemists' Association (Manchester Section): "Present-Day Methods of Oil Extraction." R. A. Bellwood.	Manchester.

Review of Grinding and Pulverising Methods

Notes on Some Modern Products

Modern research has shown more and more clearly that the properties of substances are very greatly influenced by their state of subdivision, and indeed that the behaviour of a material may undergo marked changes as its particles grow smaller and smaller. For this and other reasons, one of the most important points in the manufacture of chemical products is their grinding, crushing, or pulverisation, which may take place at any point in the course of operations. Below is given a series of articles and notes on the subject, dealing with it both from the point of view of grinding, etc., as a chemical engineering problem, and also from the point of view of particular types of machinery.

Crushing, Pulverising and Grinding Machinery

By W. Bullock

The following article was recently delivered as a lecture by Mr. W. Bullock, of Fraser and Chalmers' Engineering Works, at the Sir John Cass Technical Institute

THE subject of crushing, pulverising and grinding machinery is a wide one. Under the heading of crushing machinery would fall any machines in which, by pressure or impact or a combination of both, solid material is reduced from a block to fragments or particles economically. The ultimate degree of fineness varies considerably, and the point where crushing finishes and grinding commences is strictly an economic one.

Whether the crushing is by pressure or by impact is determined chiefly by the nature of the material to be crushed, and the shape or size of the particle to be produced. For reducing large pieces of mineral which are too large to be manhandled, crushers of the gyratory or jaw type are almost universally employed for rock or mineral which is hard and abrasive, but for softer rocks, or mineral, single roll crushers or hammer mills can be employed.

Size and Type of Machine

In determining the size of any machine, several factors have to be considered, as follows: the maximum dimension of the largest piece to be reduced, and the hourly tonnage desired. In many cases, the hourly tonnage required is a great deal less than the output of the machine in question,

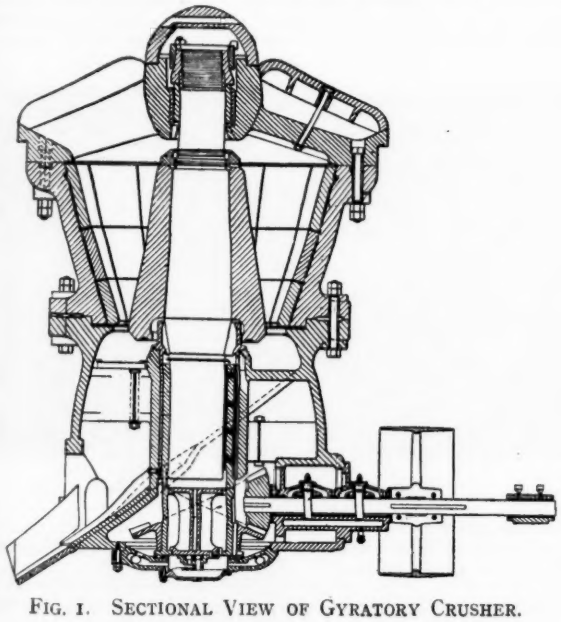


FIG. 1. SECTIONAL VIEW OF GYRATORY CRUSHER.

its size being governed entirely by the maximum feed, and under these conditions, economy has to be sacrificed.

The type of machine is decided by the hardness, toughness, and abrasiveness of the mineral and the moisture content; and the shape and size of the product desired.

For example, to crush a mineral with a hardness of 6 and upwards, a gyratory crusher, of which Fig. 1 illustrates a sectional view, would be suitable. The principle of the machine is as follows: The vertical shaft is given a gyratory movement. Upon this shaft is mounted a head or mantle, which does not revolve, and the pieces of the mineral are crushed by the pressure of this head against the liners secured to the upper part of the machine. The mineral descends by

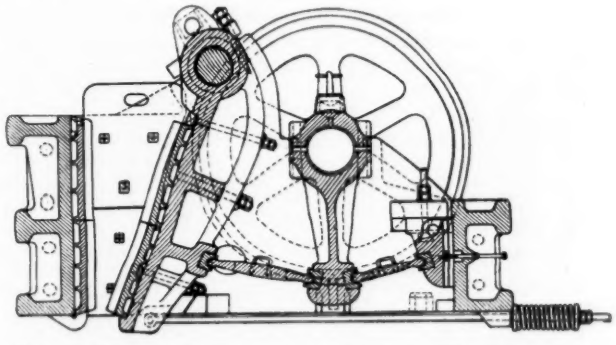


FIG. 2. RECIPROCATING OR JAW-CRUSHER—BLAKE TYPE.

gravity, the size of the finished product being regulated by the distance between the lower circumference of the mantle and the ring of liners. It will be noted that the maximum pressure is upon a line the position of which is continually changing, and this results in a somewhat lower power consumption per ton of rock or mineral crushed.

It will also be noted that the central shaft is pivoted at its upper end, the eccentric motion increasing as the particles descend. The gyratory motion being applied to this shaft at its lower end, turns this shaft into a lever exerting a pressure which increases as it approaches the pivot point.

Most of the modern machines are constructed so that the revolving parts and the mechanism operating them are working continuously in a bath of oil, circulating by such means as a pressure pump; when necessary, this oil is passed through a cooler before re-entering the machine.

The Reciprocating or Jaw Crusher

The reciprocating or jaw crusher of the Blake type, as illustrated by Fig. 2, is preferred by the majority of users to the gyratory type. In this machine, the reduction of the ore or mineral is effected by forcing a jaw hinged at one end against another jaw fixed to the frame of the machine, the necessary force being furnished through toggle plates placed almost horizontally in order to take the great pressure required to effect the crushing. The material being crushed descends in these cases as the swinging jaw recedes, so that the crushing action takes place upon one-half the stroke of the machine, a heavy flywheel being provided to equalise the load.

The shape of this type of machine enables a larger piece of rock to be received between the jaw faces than in the gyratory type of equal weight. The size of the product is regulated by adjusting the lower end of swing jaw, and the capacity is regulated by the discharge opening and the speed of machine. The simplicity of construction enables the wearing parts

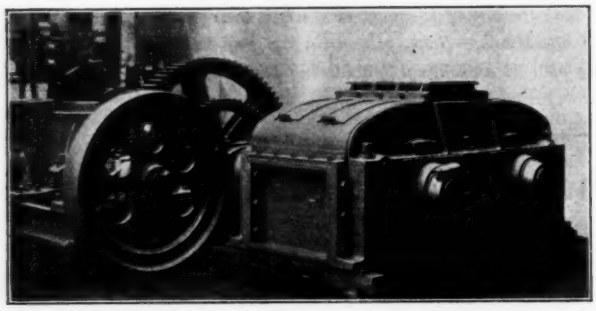


FIG. 3. GEARED ROLLS WITH INDENTED SHELLS.

to be quickly changed, and in most cases the jaw plates are reversible, resulting in a somewhat longer life than if this feature were not possible.

For material of medium hardness or brittleness, but not abrasive, a mill of the swinging hammer type can be employed. For softer material, such as laminated limestone, clay shale, coal, etc., a machine of the single roll type can be employed.

Reduction of Medium-Sized Pieces

For the reduction of medium-sized pieces, say 3 in. and under, there is a somewhat greater choice in the selection of machines, the following being some of the types most commonly employed: Gyratory crushers, short head type; granulators; cone crushers, horizontal and vertical disc crushers; rolls; stamp mills; ball mills; and hammer mills.

Gyratory crushers, for secondary reduction, do not differ to any great extent as regards principle from those employed for initial breaking, but generally have a shorter shaft and run at a higher speed.

Granulators, as they are called, have been developed to meet a demand for chippings for road surfacing, stone for reinforced concrete, etc. Most of these machines are of the reciprocating type, and have a jaw opening wide but shallow in cross section, not generally exceeding 6 in. between the jaw plates, and producing material $\frac{3}{4}$ in. ring size and under. These machines are generally run at a speed of about 300 r.p.m., and have a short stroke to give a uniform product.

The cone crusher is a machine which has been developed for the production of fine particles, ranging, say, from $\frac{1}{8}$ in. to $\frac{1}{4}$ in., where large tonnages are demanded, beyond the range of reciprocating or gyratory crushers. The machine is an American invention, and is a development of both the horizontal and vertical disc crushers. Though it has been on the American market approximately two years only, the machine has met with marked success, replacing rolls in some cases, but mostly in meeting the growing demand for finer crushed rock, stone for concrete, and even for the production of coarse sand. The smallest model produces about seven tons of $\frac{1}{8}$ in. product per hour, and the largest about 600 tons of $1\frac{1}{2}$ in. material.

Rolls

Of all the different kinds of crushing machines, rolls are possibly the best known; their types are numerous, ranging from the geared roll with a peripheral speed of a few hundred feet per minute, to the direct driven type with speeds of 1,000 and over. The crushing faces or shells vary with the work they have to tackle, and are plain, grooved, corrugated, indented, provided with teeth or spikes as occasion demands. These machines can be employed for crushing wet or dry and hard or soft material. The diameter of the roll is governed by the maximum size of piece it has to crush, and the width of face is made to suit the capacity.

The ratio of reduction is generally from 3 or 4 to 1, and the output is decided by the space between the roll faces and the speed. From 25 to 33 per cent. of the actual ribbon is taken as the capacity of one pass. Various devices are employed to relieve emergency stresses due to foreign matter, such as tramp iron, steel or wood accidentally mixed with the rock or ore. Spring rolls rely upon the security given by allowing deflection additional to the normal working load, rigid rolls upon a breaking plate or pin.

With plain rolls it is usual to run the pair at the same speed, but with grooved or indented and in some cases, toothed rolls, the speed of one roll differs from its fellow, so helping to prevent the spaces becoming clogged.

Stamp Mills

The gravity stamp mill is a type which was, until comparatively recently, the most popular machine for crushing down mineral from about $2\frac{1}{2}$ in. to sand of, say, 30 mesh I.M.M. and under, this reduction being accomplished in one operation. The machine is simple, crushing being effected between the shoe of the falling stamp and the die in mortar box—the mesh of the screen closing the box regulating the maximum size of particle, and the power to raise the stamp being determined by the weight of the falling stamp.

Weights ranging from 50 lb. in a hand stamp to 2,000 lb. are employed, though in the former case the feed particle should not exceed $\frac{1}{2}$ in. Crushing is nearly always carried out in water, one exception being the crushing of aluminium to powder. The heavier stamps (1,500 lb. and upwards) are generally employed where a coarse product, say from $\frac{1}{2}$ in. to $\frac{5}{16}$ in. is required, the stamp then being employed as an intermediate crusher and generally followed by a cylindrical mill for finishing. The individual stamp, namely, 1 pr. mortar box, enables a closer working to be maintained between feed and discharge, thus increasing the efficiency of the machine.

Ball Mills

For reducing rock from $2\frac{1}{2}$ in. and under to 10 mesh I.M.M., ball mills have in recent years been employed in place of stamps, but though the h.p. consumption per ton crushed is lower in the ball mill, the consumption of metal employed as crushing medium is greater, namely, $2\frac{1}{2}$ to 3 lb. per ton for the ball mill as compared with 1 lb. for the stamp mill. It is undoubtedly more economical to reduce the feed below $2\frac{1}{2}$ in. when crushing in a ball mill.

There are a number of types, the Hardinge conical mill being one of the most popular. In this an automatic classifying action takes place, the heavier larger particles gravitating to the larger diameter and allowing the smaller and lighter particles to discharge. Parallel cylindrical mills discharge either through a grid at one end of the mill or direct through

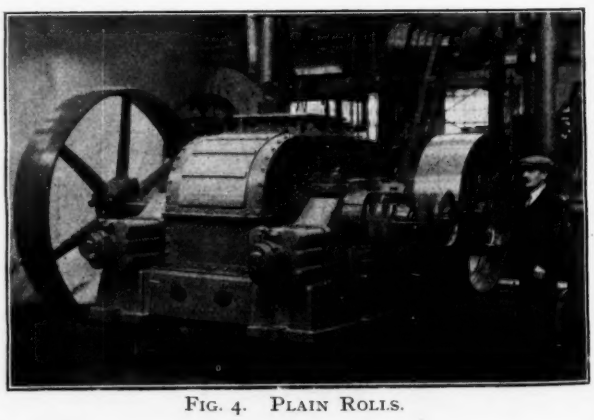


FIG. 4. PLAIN ROLLS.

the hollow trunnion. In the former case the particles passing through the grid are raised up by lifters and gravitate through the discharge trunnion.

Any of these mills can be employed in closed circuit with a classifier, the discharge from the mill gravitating to the classifier, which makes a separation between coarse and fine, returning the former to the mill for further reduction.

For the final reduction of rock or mineral to meshes ranging from 90 I.M.M. to 200, cylindrical mills either parallel or conical are standard when wet grinding is required. Such mills have linings and crushing media to suit the conditions under which they operate; for example in crushing silica or

felspar for the ceramic industry, it is necessary to supply a lining such as quartzite which will not contaminate the product, and in such a case flint pebbles would be employed as crushing media.

Mills have metallic linings of C.I. chrome or manganese steel, plain or ribbed, and pebbles can be employed with such linings. On the other hand steel balls enable a greater output to be obtained from a given mill at a corresponding increase in power. Rubber linings have been employed on cylindrical mills, but in these cases it is not advisable to employ steel balls larger than 1½ in. diameter. In such cases advantages can be taken of the reduction in weight of lining by an additional weight of balls.

Dry Grinding

The grinding of mineral in the dry state is somewhat more difficult than when grinding wet, one of the difficulties being the separation of the fine particles from the coarse in the ground product. Up to a point, this separation can be effected by screening after grinding, but it is not usual with abrasive material to carry this process much beyond 50 mesh I.M.M. Between 50 mesh and 100 mesh it is somewhat more difficult to determine whether screening or air separation should be employed to separate out the finished product, the nature of the mineral and its specific gravity being factors which help to determine this point.

Below 100 mesh, when a separation is required, it is generally accomplished by air, the picking up, conveying and releasing of the coarse particles being effected by air currents of different velocities. The types of machines for dry grinding are as varied as for wet work.

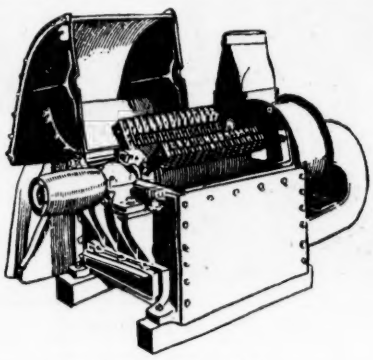
In the preparation of cement, tube mills and compound ball tube mills are undoubtedly the most popular, the latter being employed for grinding the clinker from rotary kilns. The compound mill is a long straight tube, a common size being 7 in. diameter by 36 ft. long, divided into compartments, so spaced as to effect stage reduction of the particles, the final compartment being equipped with the smallest size of grinding media in order to give the greatest surface contact possible. A mill of this size would require 500 to 600 h.p. to operate, and would produce 12 to 15 tons per hour of finished product. Another mill widely used for grinding dry and comparatively non-abrasive minerals is the Raymond.

The Hardinge conical ball mill, but with additional equipment of an air separator at the discharge end, is another type which is employed on hard or soft material, and for bituminous coal a mill of this type would require to have an internal volume of 2–2½ cub. ft. for each ton ground per 24 hours to 75 per cent. through 200 mesh. The h.p. consumption under these conditions inclusive of the air separating equipment would be approximately 27-30 h.p. per ton hour.

In the impact type of machine, pulverising is effected by a succession of blows until the final reduction is reached. The Bonnot mill is suitable for grinding coal or similar substance where a fine product is desired, separations being effected by a pneumatic separator superimposed upon the machine.

A Mill of Wide Range

"Grinds Anything Grindable" is the phrase used by Mayhew, Ramsay and Co., Ltd., of 11, Victoria Street, London, S.W., to describe their J. B. "Miracle" mill, which has the power to crush limestone, and yet is adapted to the production of a good barley meal. This indicates the wide range of products with which the mill is capable of dealing. It can be used for the successful pulverising of chemicals, asbestos, fertilisers, oilcake, bitumen, gums and numerous other materials to powder, no dressing or sifting of the resulting product being necessary. No knives, stone, grinding plates or discs are embodied in the construction of the mill, which grinds through the operation of a battery of heavy steel maces, which revolve and fly outwards as they turn, and by their impact quickly reduce to powder almost any type of solid material. The maces, each with sixteen working edges, strike the slowly falling material as it enters the grinding chamber, and the resulting powder passes through a screen and is removed. The mill possesses the advantage that it has but a low power consumption, and that there are no surfaces requiring dressing or sharpening; it dresses and sifts its own product to the degree of fineness required, without needing an additional machine for the purpose, while if a foreign body accidentally gets into the material to be ground it passes through without damage to the mill. The mill does not heat up easily, and fire risk is practically non-existent.



The "Miracle" Mill.

Combined Grinding and Blending Mills

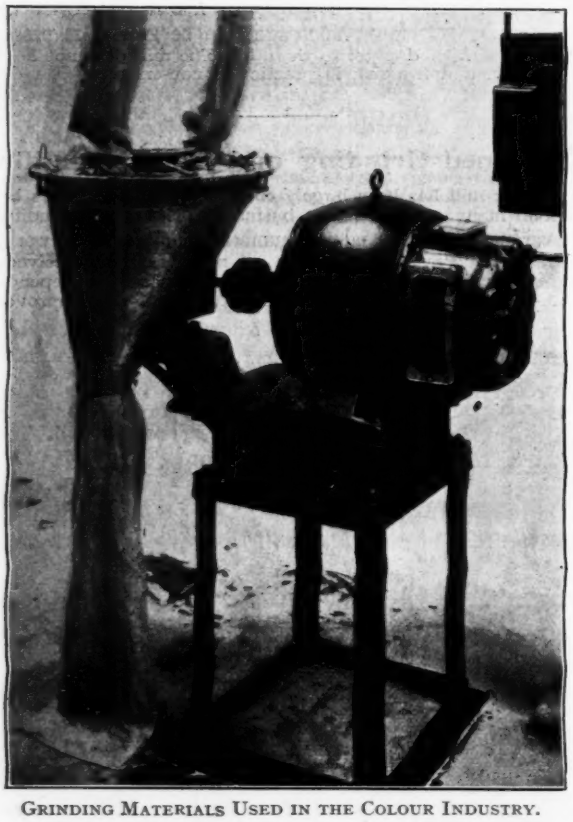
The Kek mill has been largely employed for many years by British manufacturers whose business calls for fine grinding of various products, and the number of mills now at work, with the increasing proportion of repeat orders received, forms convincing evidence of its effectiveness and dependability under varying conditions. Recent radical improvements in design have given the mill a considerably wider applicability, particularly as regards materials having a high moisture content, or of a pasty nature, and the latest type is said to be an effective and economical machine for the reduction and blending of a large range of products, among which may be especially mentioned fine chemicals, food preparations of all kinds, icing sugar and confectionery products. In the pulverisation of coal for use in pulverised fuel plant, the Kek mill has given most favourable results, and in conjunction with the Buell burner is embodied in the well-known Buell pulverised coal system.

A "Kek" Mill in a well-known Chemical Works.

Kek mills are available for, and carrying out, operations such as reduction of friable material in dry, moist (plastic) or wet condition; blending together in the most intimate and uniform manner two or more materials; grinding dry substances in (or into) liquids to secure homogeneous conglomerates or permanent suspensions; blending to a uniform compound liquid two or more liquids, either with or without chemical reaction; and defibring—over a wide range of materials.

Method of Operation

The Kek mill is of the intercalating pin type, and its design and construction have secured such accuracy of balance that vibration is reduced to a minimum. It can be installed without the cost of heavy foundations, and may be fixed on any ordinary floor. It is fitted throughout with ball-bearings, and a special metal is employed in the worm-drive, which

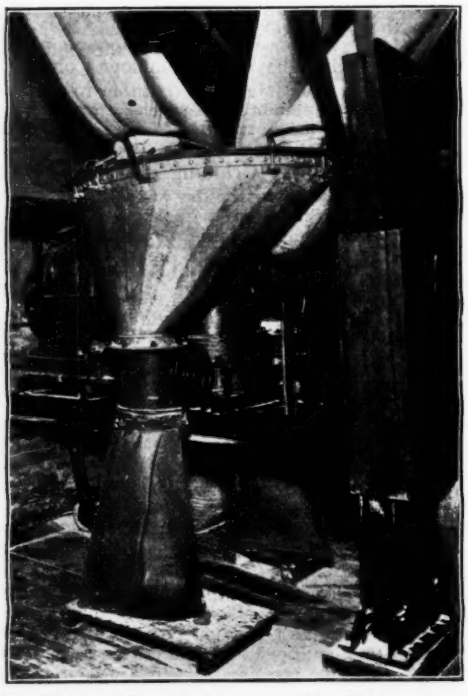


GRINDING MATERIALS USED IN THE COLOUR INDUSTRY.

runs in an enclosed oil bath, thus ensuring smooth running and high speed. The mill can be driven by belt or coupled direct to an electric motor. The grinding discs and circular discharge ring are designed and constructed to permit of the free discharge of material. The inflow and circulation of air caused by the rotary disc keep the material perfectly cool, so that products of low-melting point, such as stearine, resin, glue, gums, waxes, etc., can be rapidly ground without deterioration or risk of clogging. The mill acts as an efficient blender, and in many instances grinding and blending can be accomplished simultaneously.

The kek mills are made with bins of 6 ft. 3 in. diameter and 3 ft. 3 in. depth; 4 ft. 3 in. diameter and 2 ft. 5 in. depth; and 20 in. diameter and 20 in. depth. They weigh from one ton in the largest size to 280 lb. in the smallest. The largest is 42 in. in height, the medium size 32 in. high, and the smallest, mounted on a pedestal 54 in. high.

The Kek mills are now manufactured and marketed by the Buffoline Noiseless Gear Co., Ltd., of 27, Lots Road, Chelsea, London, who formerly made these mills for Buell Combustion Co., Ltd., and the manufacturers, from their experience, are able to furnish prospective users with detailed preliminary indications in reply to inquiries submitted. In addition, they maintain a demonstration plant, a test house, and a laboratory to ensure that the best results are obtained from the mills. The mills are capable of dealing with the following wide range of products, among others: antimony, animal charcoal, alum,

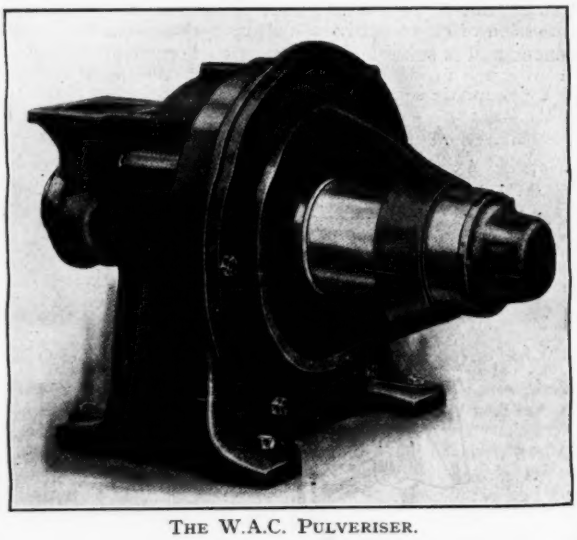


SUGAR GRINDING WITH A KEK MILL.

borax, casein, charcoal, China Clay, dextrine diatomite, felspar, French chalk, fuller's earth, graphite, iron oxide, lignite, lime, litharge, lithopone, calcined magnesite, mica, oxalic acid, spent oxide, phosphates, potash, plumbago, quicklime, sodium nitrate, soda ash, and talc.

The W.A.C. Pulveriser

The W.A.C. Pulveriser, also a product of the Buffoline Co., is of comparatively recent introduction, and is arranged for



THE W.A.C. PULVERISER.

two-stage operation. Within a pressure-tight cast-iron casing there rotates, at high speed, a set of steel discs, mounted on a horizontal steel shaft. The rotating discs are of varying

diameters and rotate in separate chambers of corresponding diameters. The revolving and stationary discs are fitted with specially hardened steel abutment pins, between the surfaces of which the pulverising action is progressively carried out. The successful results obtained are due to the progressive spacing of the concentric rows of these abutment pins on the rotating and stationary surfaces, which ensures that as the size of the particles diminishes they are still subjected to the same shattering effects in all stages of the process. The large volume of air, which is generated by the action of the rotating discs and abutment pins, is sufficient to carry over the finely divided particles and carry them into collecting bins and separators. The air current may also be arranged to carry finely powdered coal fuel direct into the boiler furnaces or storage bins, without any outside assistance. The degree of fineness can be controlled within certain limits by regulating the rate of feed of material and the speed of rotation of the mill. If finer degrees are desired, specially constructed sets of rotating and stationary plates and abutment pins can be supplied.

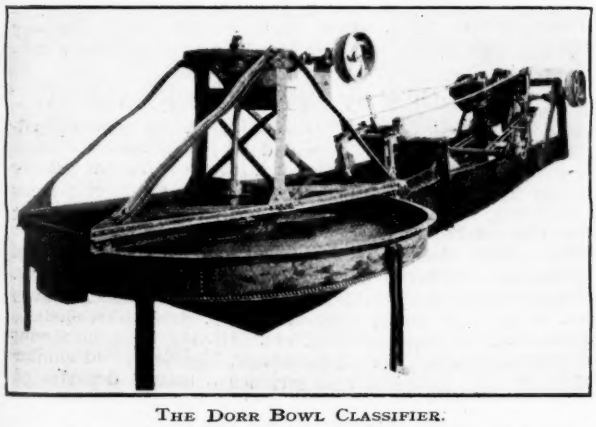
Grinding and Classification in the Chemical Industry

Closed-Circuit Operation

THE subject of grinding and classification is an exceedingly wide one, and the question of its application in the chemical industries renders it still wider. Only one of the departments into which the field may be divided will be dealt with at the moment; this refers to what is termed closed circuit grinding, regarding, for the present, wet way grinding only.

The Bowl Classifier

Like many of the developments of chemical industry in the direction of continuous production and automatic handling of comparatively large tonnages of solid-liquid mixtures, closed circuit grinding has been adopted as a result of the experience of the metallurgical industries. The underlying principle is that in place of grinding a material fine enough to allow it practically all to pass through a fine screen, say, of 150 mesh after one passage through the mill, the material is passed more rapidly through the mill and subjected to a classification for separation of sufficiently ground and oversize particles. In the early day of closed circuit grinding in metallurgical practice on the Rand, settling cones were very generally employed to affect the classification, but these show



THE DORR BOWL CLASSIFIER.

poor efficiency. Modern practice is to employ some type of mechanical classifier such as the well known Dorr bowl classifier made by the Dorr Co., of 16, South Street, Finsbury, London.

This is a two-stage classifier consisting essentially of a shallow bowl provided with a central feed distributor, an overflow launder, a central discharge aperture and a stirring mechanism. This bowl is attached to a trough-shaped tank with vertical sides and a sloping bottom, in which tank a reciprocating raking mechanism operates. The action of the machine is as follows: the discharge from the grinding mill consisting of, say, equal weights of water and solids, is further diluted to about 6 parts of water per part dry solids (depending on the mesh of separation desired and the specific gravity of the solids), and enters the bowl by way of the central feed distributor. In passing from the centre to the periphery the coarse particles settle, and only the fines overflow into the launder. The settled oversize, containing also some fine material, is ploughed to the central aperture and discharged into the second stage of reciprocating rake compartment, where the rakes pick up the oversize and convey it along the sloping bottom of the tank. The movement of these rakes in the restricted space under the bowl is regulated to give sufficient agitation to keep the fines in suspension. Water is added in the form of a spray near the point of intersection of the solution level and the sloping tank bottom, and causes an upward current to flow from the second stage into the first

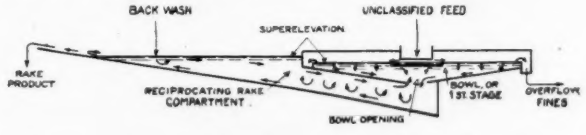


DIAGRAM OF THE ACTION OF A DORR BOWL CLASSIFIER.

stage *via* the aperture in the bowl, thus carrying the fines back for re-treatment. The oversize particles are well drained during raking after emerging from the water in the tank and are ready for re-entering the grinding mills.

This system of grinding makes it easier to obtain a product of given fineness with a minimum amount of oversize without the overgrinding that is very liable to occur when the oversize particles are protected from the grinding medium inside the mill by fines ready for discharge. Closed circuit grinding would be expected to cut down wear on mill linings and grinding media, and also to demand less expenditure of power. The figures given later show this to be the case.

Increased Capacity of the Mill

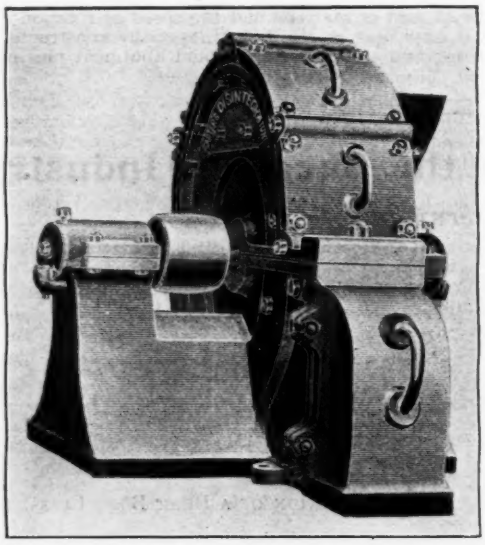
A still more important advantage is the greatly increased capacity of the grinding mill as compared with open circuit work, not only on fine grinding but also in ball mill operation. For example, at a mine in Canada milling gold ore, by changing to closed circuit the capacity of a tube mill grinding to 200 mesh was increased from 190 tons to 275 tons per day. The power required was reduced from 200 h.p. to 180 h.p., and ball consumption was reduced from 6.5 to 3.2 lb. per ton of ore, while linings showed much longer life.

In this system of grinding, a circulating load of oversize material is carried, and the relative amount of this seems to be a most important factor in determining the increase in capacity of the mill. The modern tendency is towards larger and larger circulating loads, and despite some very bold experiments the upper limit has not been definitely determined. At the Chino Mill in New Mexico, for instance, six classifiers were employed on one grinding mill, and increased the capacity from 200 to 800 tons per day. At present general practice is to have a circulating load of from 300–400 per cent. These striking results have not failed to arouse interest in such industries as the ceramic and cement industries. A careful series of experiments at a Swedish pottery showed that a batch grinding cylinder required twice as much power as a continuous tube mill working with a Dorr classifier, while yielding a product containing more oversize material. English potters have also adopted the system in several mills and are convinced of its advantages, but detailed figures are not available.

In the chemical industries, conditions of severe corrosion frequently arise in grinding problems, *e.g.*, wet grinding of phosphate rock in dilute acid solution, and the chemical engineer has been faced with the problem of developing an acid-proof tube mill, and has successfully done this. The classifier also can be constructed in acid-proof material, so that closed circuit equipment is available which is able to withstand very severe corrosive conditions.

Disintegrators and Grinding Mills

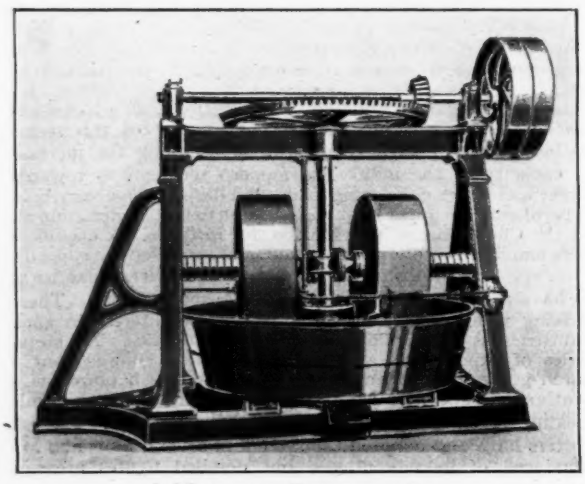
IMPORTANT points in good grinding plant are as follows: (1) Large capacity; (2) fineness and evenness of sample; (3) minimum use of power for desired result; (4) small cost of upkeep; (5) small requisite space; (6) minimum need of



A COMBINED DISINTEGRATOR AND DRESSING MACHINE.

attention; (7) adaptability. Carter's disintegrators and grinding mills, manufactured by J. Harrison Carter, Ltd., of Dunster House, 12, Mark Lane, London, are designed to fulfil these requirements. Wearing parts are specially hardened.

The grinding or reduction of the material is performed in this machine by percussion, instead of by friction or rubbing. The body of the machine is of cast-iron, the inside of the circular grinding chamber being lined with renewable chilled iron plates to reduce the wear. The bottom half of the circumference of this chamber is formed by screens held in position by adjusting screws. A strong spindle carried in self-lubricating ring bearings runs through the centre of the grinding chamber, and carries a cast-iron and steel combined disc



A MILL WITH REVOLVING PAN.

(probably one of the strongest yet designed), which, in turn, holds a series of from four to six beaters, the tips of which run close to the inner circumference of the grinding chamber, and, when running, cover the whole width of this chamber. The beaters are mainly responsible for the grinding, being assisted, however, to some extent by the ratcheted sides and top of the machine. The beaters are easily changed, are hardened to resist wear, and can also be cheaply repaired when worn.

The use of screens of various meshes enables the finished material to be ground to any desired size, fine or coarse; and also allows the finished material to at once escape. The mesh of screens, varying as they may from $\frac{1}{16}$-in., and rising in gradations of $\frac{1}{16}$-in. up to 3-in. mesh, enables the disintegrator to treat almost every article likely to be ground. The screens, and to an extent the speed, regulated the degree of fineness to which any material is reduced; and these screens being made in very varied meshes, as mentioned above (easily and quickly changed), enable a great variety of materials to be ground, and a large number of grades produced. The material to be ground is fed in as near the periphery of the grinding chamber as possible, and there meets the beaters, which, travelling at a high speed, beat and drive the material against the top linings. The particles, as they become sufficiently fine, pass between the bars of the screens into the receiving chamber below, whilst the coarse particles are still further operated on by the beaters until they are eventually reduced. It will therefore be seen that the grinding and discharging action is continuous.

The makers' catalogue gives a list of materials successfully ground by Carter's disintegrators—a list of which is so long and comprehensive that it is impossible to give an adequate idea of it in the space available in these columns. The products of the firm include combined distintegrators and dressing machines; automatic feeds; vertical steel cone mills (for grinding coffee, sugar, drugs, etc.; dust collectors; shaking sifters; centrifugal dressing machines; grinding mills of various types, not only power driven, but also manual driven; crushers; breakers; rolls of various types (high-speed fine crushing, geared fine crushing); and numerous others. The mills are of great variety, including among others the general purpose "Hercules" mill (with two pairs of rollers and concave); hand, horse and small power mills; pebble mills; ball mills; vertical runner mills; granite edge runner mills; mills with revolving pan, overhead driven with perforated bottom and stationary pan underneath; iron edge runner mills for paint works, etc. In addition the company manufactures a large amount of plant accessory to the above.

Grinding by Specialist Firms

CIRCUMSTANCES occasionally occur when the amount of grinding done by a particular firm would not justify the installation of a special plant, and it is in such instance that the grinder to the trade comes to the rescue. One of the largest firms specialising in this kind of work is the Central Pulverising Co., Ltd., of Bermondsey, a firm which has had, in the past fifteen years, an extensive experience of grinding all types of materials. The firm regularly deals with glues and gelatines, casein, starch, chalk, talc, asbestos, non-poisonous chemicals and drugs of all kinds, magnesite, mica, nitre cake, shellac, quebracho, tanning materials, etc. Having been successful in experiments in grinding plumbago, blacklead, and similar products, the company also includes a special department for dealing with black materials. The company claims that whereas the usual grinding loss is 5 per cent., this loss has been reduced to about half of this figure and sometimes less.

Leather Chemists' Conference at Northampton

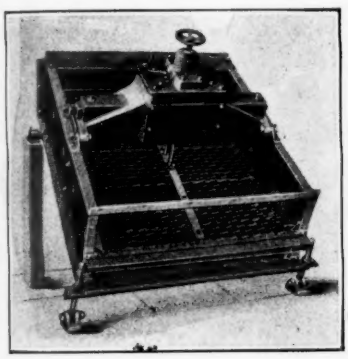
ABOUT a hundred members of the leather trade assembled at Northampton on Wednesday, November 14, for a two-day conference under the joint auspices of the Federation of Curriers, Light Leather Tanners and Dressers, Inc., and the Society of Leather Trades' Chemists. The conference was the first of three to be held at various centres with the objects of promoting co-operation between all sections of the trade and of providing general instruction on technical matters. Papers were read at the first session on "The functions of oils and fats in oiling off, fat liquoring and currying," by Mr. D. Burton, of Oldham, and "The production of fancy effects on leather," by Mr. W. D. Brown, of London. At a later session Mr. W. A. Sowray, of Leeds, spoke of the "Retanning of skins," and Mr. P. Ray Barker, of Otley, on "Some controversies in the E. I. kip trade." On Thursday, the boot factories of Manfield and Sons, Ltd., and Pettit and Sons, Ltd., were visited.

Grinding Mills with Air Separation

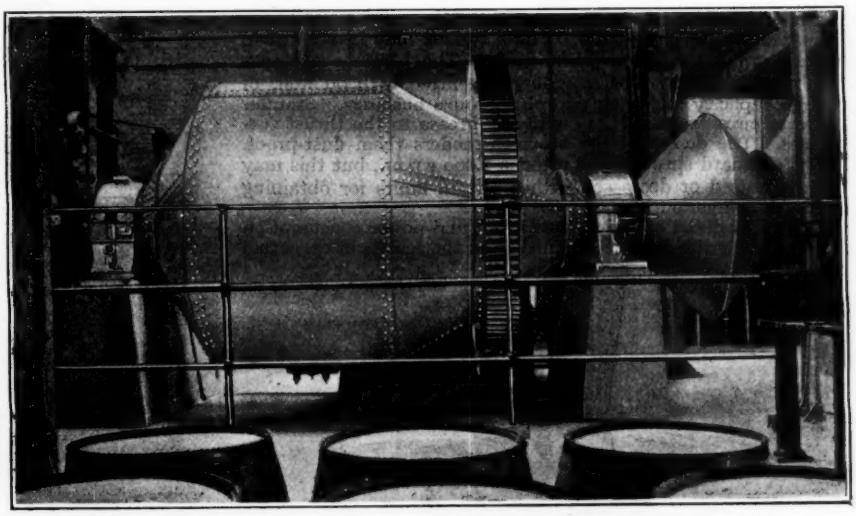
An Adjunct to Efficient Working

AMONG the products of International Combustion, Ltd., of 11, Southampton Row, are Raymond roller mills. In the early mills of this type, the grinding chamber was surrounded by a screen through which the material had to pass, and when a fine-finished product was desired, it was necessary to use a very fine mesh screen or to bolt the material outside of the mill and return the tailings to be reground. In the present standard construction the firm uses its pneumatic separator and admits the air underneath the grinding surface, taking the finished material away by the air current as quickly as it is reduced by the rolls, thus keeping the mill free of fine material. The coarse material carried up by the air current is separated from the fine in the separator, the fine being carried directly to the cyclone collector by the air current and the coarse being returned to the grinding chamber of the mill.

These features of the Raymond roller mill give the rolls the highest efficiency and account for the great capacity of these mills per horsepower, at the same time ensuring a finished product of uniform fineness. The great bulk of materials pulverised (such as coal, coke, gypsum, limestone, phosphate, rock and similar products) are reduced to a fineness of about 90 to 95 per cent. through 100 mesh.



A HUMMER SCREEN.



A HARDINGE MILL.

Hardinge Conical and Other Mills

These are also produced by International Combustion. Conical ball and pebble mills are recommended for wet or dry grinding, and for either coarse or fine products. The conical shape of the mill brings into operation a classifying action within the mill which gives a large capacity for the power expended. The range of grinding is large because of the segregation of sizes within the conical mill. It has also been found that the lining wear is low. The conical shape insures extreme rigidity, and because of the simplicity of construction, mechanical troubles are practically unknown. Labour costs are low, as the mill is easy to operate. Conical mills are built in sizes ranging from 2 to 10 ft. in diameter with capacities of a few pounds an hour to 50 tons an hour.

For the separation of finely ground materials, the reverse current air classifier, attached to the Hardinge conical mill, meets the severest specifications. The material is conveyed without auxiliary apparatus to any convenient location in the building. Any fineness up to 99 per cent. passing 325 mesh can be secured.

The Hardinge mill is claimed to have the ability to grind even the most refractory materials at very low cost per ton. A few materials which are being successfully ground by Hardinge mills are carborundum, coke, brass ashes, zinc skimmings, tin ashes, speiss, nickel waste, cement, limestone etc. Big Hardinge mills have been ordered by one of the largest chemical companies in the world for erection in the North of England.

The Hummer screen, produced by International Combustion, Ltd., is a strongly-built rugged machine performing 10, 12 or 24 hours per day, week in and week out. No cams, hammers, eccentrics, unbalanced shafts or other complicated mechanisms are used. The character and intensity of vibration imparted to the wire mesh by the electric vibrator produces a sorting action which throws the larger particles to the top of the load and off the screen, while the fine material hugs the screen and is given every opportunity to pass through the meshes. Many damp materials cannot be screened with revolving screens because they ball up and merely roll over and over, while the few loose particles clog the screen openings, stopping all screening action. The powerful impact of the Hummer electric vibrators has solved many damp-screening problems by keeping the mass broken up and the meshes open, and highly satisfactory tonnages and separations are produced. The Hummer screen, both wet and dry, requires absolutely no lubrication. Some of the materials at present being screened by Hummers, in Great Britain, are coal, sand and gravel, cement, starch, glass sand, zinc, tin ore, barytes, granite chippings, sugar, anhydrite, limestone, etc.

The same company is also responsible for the Raymond automatic pulverisers with air separation, which are successfully grinding a very wide variety of products. They are particularly applicable where an extremely fine powder is required; where a uniform product is necessary; where the raw material is of a damp or sticky nature; where an absolutely dustless grinding operation is desired, or wherever the material handled is poisonous in its nature. Raymond pulverisers are built especially for fine pulverising, and designed for use in connection with air separation. By the use of the Raymond vacuum air separator, fineness of the finished product is at all times under the absolute control of the operator.

A very useful feature, which can be applied to most Raymond pulverisers, eliminates the human element with regard to maintaining capacity and uniform fineness of finished product. This is the pneumatic feed control. This feature might well be termed the "brain" of the pulveriser; for through its operation maximum capacity and a product of uniform fineness is automatically assured. Operating entirely by the change in vacuum in the machine (which in turn changes as the amount of material fed varies) a maximum capacity is produced regardless of the attention or inattention of the operator.

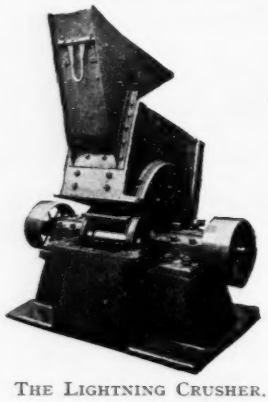
C

Continuous Crushing

THE economic reduction of hard and abrasive materials from relatively large pieces to small sizes in one continuous operation is an important requirement of industry. The Patent Lightning Crusher Co., Ltd., 11, The Grange, Bermondsey, London, claim to have evolved a solution of the problem. Their "Lightning Crusher" is a high-speed machine working by centrifugal force and impact, and functions as a disintegrator, granulator, pulveriser and mixer combined. It is at present manufactured in two sizes and consists of an upper and lower casing and a rotor upon which are mounted the impact members or hammers. The upper casing, to which is attached the feed hopper, is hinged upon the lower casing and registers with it. Both the upper and lower casing are protected all over by special alloy steel lining plates, which are all easily changeable. For fine outputs, a grid composed of parallel screen bars is fitted into the bottom chamber to prevent material leaving the machine until sufficiently reduced.

The rotor consists of a turned steel shaft, upon which are mounted two heavy turned cast steel discs perforated with sets of drilled holes, each set being at a different distance from the centre of the disc. Between the discs, at opposite points are swung two heavy alloy steel hammers, one of which can be seen in the illustration. The hammers may be set out to their original position when worn. The bearings are self-lubricated of ring feed type, and are fitted with oil wells of large capacity and with phosphor-bronze bushings. Stauffer grease cups are fitted for supplying grease to the thrust surfaces. The design of the bearings renders them dust-proof. The standard speed of the rotor is 1,000 r.p.m., but this may be increased or decreased within certain limits for obtaining finer or coarser outputs.

For any given material, the output and power consumption of a crusher are best determined from the results of an actual



THE LIGHTNING CRUSHER.

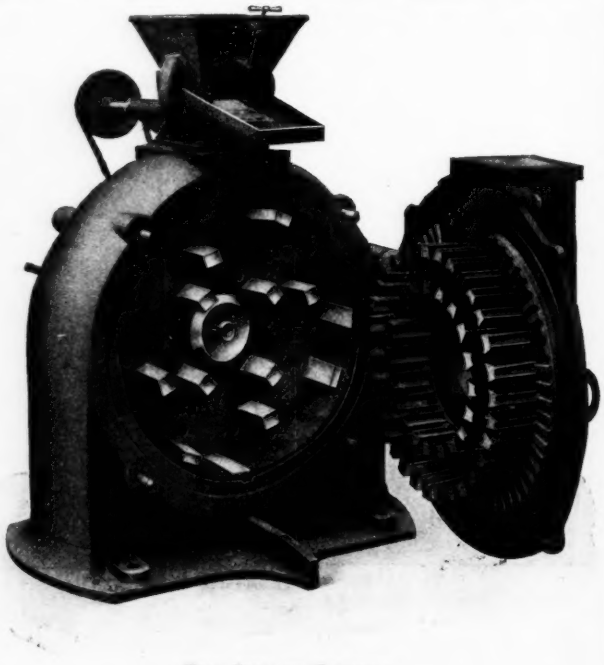
test. The following data gives, however, some idea of the performance to be expected. A No. 1 size machine (the smaller) will reduce flint, gravel, clinker, etc., not exceeding 2½ in. cube maximum feed size to about ¾ in. cube and downward at the rate of fully five tons per hour. It will reduce limestone to all passing a ⅛ in. mesh at the rate of one ton per hour, or burnt lime at 30 cwts. to two tons per hour. A No. 2 size machine will reduce the same materials at the rate of 15 tons per hour to ¾ in. cube and downward and three to eight tons per hour to ⅛ in. and downward. It should be noted that the crusher will pulverise material of relatively large size in one operation to all fine grit, a large proportion of which will be of exceeding fineness. For example, a quantitative test made with a No. 2 crusher fitted with $\frac{1}{16}$ in. spaced bars and working at 1,000 r.p.m. reducing hard limestone, gave a product of which 35 per cent. passed a 50 mesh and 21·2 per cent. passed 100 mesh.

The following are among the many substances successfully reduced by the "Lightning Crusher": asphalt, barytes, chalk, coal, emery stone, fire-clay, saggers, flints, gravels, lignite, limestone, burnt lime, magnesite, metallic slags, quartzite, silica, sandstone, slate, etc.

The company also manufacture a masticator for reducing such difficult materials as fish offal, waste food, bones, town refuse, etc. Six of these masticators are employed by the Metropolitan Borough of Southwark for treating refuse. Of these, the original two machines have been in constant use for over 20 years and are still giving efficient service. A well-equipped testing depot is maintained, where the fullest facilities are given for clients to see tests carried out on their own material.

Crushing and Pulverising Machinery

FOUNDED 25 years ago, the firm of W. S. Barron and Son, Ltd., of Ladybellgate Street, Gloucester, is engaged in the production of machinery for grinding, crushing, pulverising, sifting, mixing, dressing, etc. Their "D" type Dreadnought grinder consists of two grinding stones, one fixed and one rotating, inside a substantial cast iron casing with bed, machined true, the stones being made of a special "Dreadnought" composition, which varies in grade according to the material to be ground. The improved "Impact" pulverisers are designed to produce fine powders from stone, slate, lime-



THE IMPACT GRINDER.

stone, chalk, coal, etc., the various models having capacities, according to material and fineness, of 20 to 30 cwt., 30 to 50 cwt., and two to four tons per hour. The roller mills produced are four pair, three pair, two pair and one pair high, with and without sieves. The "Standard" stone crushers are made in two types: a heavy type for hard stone, ore, etc.; and a light type for breaking limestone, etc., to a size suitable for feeding into the "Impact" pulverisers. The "Hercules" crushing mills are of the hand, horse, or small-power type. The No. CC crushing and grinding mill, with one pair of rollers and concave, deals with bones, cake, oyster shells, etc. The general purposes mill of this type has two pairs of rollers and concave. The "Impact" grinder is one of the best-known products of the company, and finds wide application in artifical stone works, biscuit factories, chemical works, soap works, fertiliser factories, etc.

Trade Grinding

THE grinding of rocks, ores, and almost any other materials for the trade is undertaken by Thomas Hill-Jones, Ltd., of "Invicta" Mills, Bow Common Lane, London. The company's works are equipped with mills of various descriptions, and it is in a position to grind large quantities. The company has its own wharf at Bow Bridge, and can arrange storage of materials sent in for grinding, and lightering from ships. Grinding for experimental purposes is also carried out. During the war the company held contracts from Government departments for the grinding of various materials.

Some Notes on Solvent Extraction

Advantages and Applications of the Process

In the preparation of these notes we are chiefly indebted to the well-known firm of George Scott and Son (London), Ltd., who have specialised in this field for many years and who have many interesting suggestions, based on their wide experience, as to the advantages of the process and the particular operations to which it can most profitably be applied.

As is very well known, during the war the demand for solvent extraction plant in the production of oils from seeds, nuts, and kernels was acute, and as a result many installations were put down. Not only were solvent extraction plants installed, but plants for the production of such oils by the older-fashioned hydraulic pressing system were also established. The result of that "spurt" as one might term it, in oil extraction, is being felt to-day. Since the boom immediately following the war, and during the war for that matter, oil extraction, either by the solvent process or by the pressing system, has been under a cloud. Practically no plants have been installed in this country, with one or two exceptions, since about 1920. As a consequence, makers of oil crushing and solvent extraction plants, in so far as oil seeds, nuts and kernels are concerned, have had to look elsewhere for custom.

Post-War Slump

While the number of plants erected during the boom period accounted to some extent for the lack of demand for such equipment to-day, the lack of business in this connection is not entirely due to this. There is something else underlying the whole matter which it is a little difficult to lay one's finger on. It is perfectly obvious that much of the oil seeds, nuts and kernels which came to this country for a few years are now being diverted to continental ports. One would, however, ask how it comes about that all the oil, cake and meal could be absorbed during the boom period while apparently there is not the same demand to-day. If there were a demand for the oils yielded by these vegetable products, then no doubt producers of such oils would find an outlet for the resultant cakes and meals, and *vice versa*. The two seem to be linked up together.

The demand undoubtedly does not exist for more than what one might term a stationary quantity of oils, and as far as one can gather the demand for meals seems to be falling off. Why this should be so it is not easy to say. But the fact remains that in so far as plant for the production of oils from seeds, nuts and kernels is concerned, either by solvent extraction or hydraulic pressing, oil mill engineering has receded to almost vanishing point.

Of course, solvent extraction is developing in other directions, and engineers have consequently been able to make good the shortage of inquiries in the direction already referred to in other ways.

Treatment of Animal By-Products

Take, *e.g.*, the treatment of animal by-products. This country has not yet wakened up to the possibilities. There are still numerous small plants in operation handling condemned meat, bones, animal offal and such like on what are termed "rendering lines." It is almost incredible that this wasteful process should be pursued in the light of the knowledge which is available to-day. Such material can be cooked in a steam-jacketed vessel, and such fat as will drain from it removed in the rendering vessel. The residues may then be transferred to hydraulic presses or centrifugal fat separators of the whizzer type and additional oil thus secured.

The residues remaining, however, after pressing or whizzing still contain such a percentage of fat as would justify the installation of a central plant to deal with the seresidues; in other words, to go round the country buying these residues from producers and centralising in one large unit capable of handling the material on such a scale is not, of course, possible in small establishments. This might well prove a remunerative enterprise. It has amazed experts that for many years concerns which ought to know better continue to use these primitive plants. In the United States much the same sort of thing is going on, but the problem is of a different order. In referring to the use of rendering plants and the displacement of these by up-to-date solvent plants, the fact should not be lost sight of that the solvent plant is not ideal in the production of an edible article. If, *e.g.*, fresh ox fat is available, as is frequently the case in the United States, and can be handled promptly, then obviously it would be unwise to touch that with a solvent when a direct rendering process will yield an edible article.

Where issue might be joined with large manufacturers is that when the edible fat has been obtained these residues should be pressed and then ground, and the ground product sold as a so-called feeding meal, when it is not in the best sense of the word a feeding meal of the highest value, but a meal containing an excess of fat which, from many feeding points of view, is undesirable. In the States there are quite a number of plants now in operation devoted exclusively to the extraction of fat from the residues produced in the packing houses. While there are a number of such solvent plants in operation, it should be stated at the same time that even in Chicago and farther west, where the large packing establishments are centralised, the fullest use is not made of these residues.

The writer made a trip through that part of the United States quite recently, and was greatly impressed by the field which exists there in the direction of the better utilisation of the residues by solvent treatment. The producers of these by-products, however, are more alert in the United States than in this country.

Waste Animal Products

When one leaves aside the question of the edible article and considers the handling of waste animal products which are suitable only for the production of a technical fat, then unhesitatingly it may be stated that the solvent process is ideal. There should be no intermediate rendering in steam-jacketed vessels, or steam digestors entailing whizzing and pressing. The Scott solvent process, for example, can be applied to such raw material and the process made a combined one for the elimination of moisture and the extraction of grease. If one thinks for a moment of the loss which is involved in many of the digesting plants still in operation, where the gelatinous liquors are run down the drain, it will be appreciated just what is possible on the lines which have for many years been suggested to users of such plant in this country. There are not so many open steam digesting plants in use to-day as there were some years ago, but even the rendering process for animal by-products unsuitable for the production of an edible fat is obsolete, with its double handling and all the incidental expenses involved.

By the solvent process, not only can an increased yield of fat be secured, but a feeding meal of an infinitely higher value is derived. It is generally recognised that a feeding meal should be low in grease content and high in other feeding constituents. Only the solvent process is capable of achieving that. What amazes one is that while this point may be overlooked, producers of such meals do not realise that in selling meals high in grease they are actually giving money away. They are not only depriving the purchaser of a first quality feeding meal, but they are themselves losing fat which they could extract and sell at full fat values instead of at feeding meal, and sometimes even fertiliser, values.

Fish Meals

The same holds good in the case of fish meals. Producers of fish meals are wakening up, and for that the Fish Meal Association which exists in this country is entitled to some of the credit For years an effort was made to hammer this point home before the Fish Meal Association was ever dreamed of, but that Association, as a disinterested body, has brought home to the trade and to the users of such meals the necessity for producing a fish meal with a low oil content Even two or three years ago meals which contained as much as 10 per cent. or even higher percentages of fish oil were sold for feeding purposes. To-day a meal containing more than 5 per cent. of oil would be unmarketable. That is as it should be.

Makers of fish meals are therefore right up against the necessity for the use of solvent extraction plants, but it is only the fact that they cannot market their products, if high in oil, to the fullest advantage that has brought the necessity for solvent extraction home to them. If they could have

realised years ago that the extraction of the oil for its own sake would have justified the installation of a solvent extraction plant, then the revolution which is coming to pass to-day as a result of the demand from the feeding meal users, would have been accomplished years ago.

It is almost impossible to compress into a reasonable space what could be written in regard to the handling of fish and its by-products. Take the classical oily fish around our coasts —viz., herring.

Handling of Fish and Its By-Products

We have all sorts of problems to deal with in handling herring and its offal. We have curer offal, kippering offal, and at times whole herring. The oil contained in the herring varies according to the season of the year. At times we can justify the "straight extraction" of herring offal by the solvent process. At others one should recommend the elimination of the moisture before extraction. In the early part of the season in the North of Scotland the herring is very oily. There it would be impracticable to attempt to eliminate water except while at the same time extracting the oil. Where the oil exists to a sufficient extent, the process, not only of extracting the oil but of eliminating the water, is greatly simplified. Later in the year, when herrings are being landed extensively at Yarmouth and Lowestoft, they are low in oil, but still contain sufficient to justify extraction.

At this season of the year, and in these particular ports, however, the process which may be recommended on our far North East Coast could not be advocated on the more Southerly Coast. If readers do not already know it, it will surprise them to learn that the offal which is available in such vast quantities in Yarmouth and Lowestoft is carted by the farmers and spread on the land. This has been practised from generation to generation. Farmers are notoriously conservative. They will do the things their fathers did, without knowing precisely why they are doing it. They know, *e.g.*, that fish offal if applied to the land will improve the crops, but it is doubtful if they ever think that when they are carting herring offal out into the country from Yarmouth or Lowestoft they are carting material containing 75 per cent. of water, and that every ton of fish offal carted out of the port contains 15 cwt. of water. Not only so, but when this material has been spread on the land it would be very interesting to know what proportion of it is taken up by the birds which hover around in vast numbers awaiting an easy meal.

Then there is the further disadvantage that the herring offal, even at the season of the year when it is least oily, still contains an undesirable percentage of oil from a fertilising point of view. This oil cannot be absorbed by the land. It turns rancid and is consequently extremely undesirable. If the farmers in that area, who have, for generations, been making use of this material, could realise that they could obtain infinitely better results by buying artificial fertilisers prepared on a scientific basis, then the offal in Yarmouth and Lowestoft would be used to infinitely better advantage after treatment in suitably designed plant.

Extraction and Distillation Apparatus

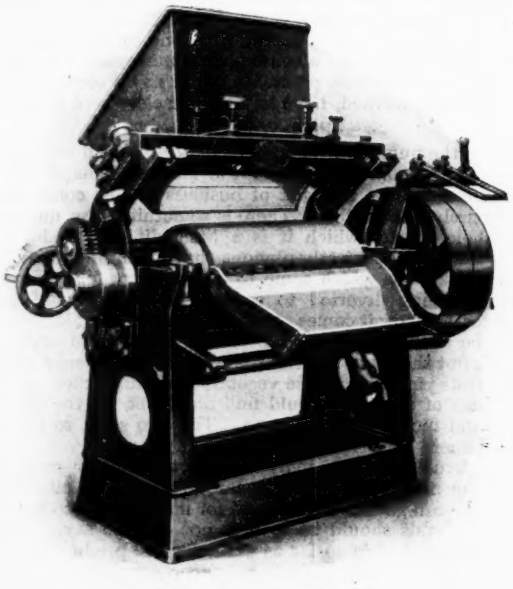
For manufacturers who are in need of extraction apparatus, Bennett Sons and Shears, Ltd., of Shoe Lane, London, make numerous types of plant suitable for many purposes. Construction varies, of course, according to the requirements of the material to be treated and the scale of operation. The company's catalogue contains details of apparatus for continuous extraction of drugs by hot spirit percolation and ultimate recovery of the spirit; a combined vacuum still and solvent extraction apparatus; numerous types of stills for the chemical and distilling industries; and much other plant and apparatus.

Opening of Bituminous Coal Conference

The opening address of the Second International Conference on Bituminous Coal, which is now proceeding in Pittsburgh, was a paper by Lord Melchett on "Coal Problems in Perspective," in which he stated that what was required was in the various countries national arrangements which should so rationalise the coal industry that productive power was brought into line with consumption capacity.

A Single Roller Mill

The single roller mill made by Sidney Smith and Blyth, Ltd., of Garratt Lane, Wandsworth, London, is claimed to give important results in grinding paints and enamels, for it performs simultaneously the operations of fine grinding, finishing, and straining. The single roller mill is also remarkable for the quantity of material it will deal with. The single roller mill is primarily intended for finishing liquid and semi-liquid materials after suitable preparation. In the case of white lead, for example, it is only necessary to reduce the material to a liquid or a semi-liquid, in a pug mixer, before passing direct to the single roller mill, where all trace of tan is eliminated and the product is given a higher gloss. The peculiar properties of this type of mill render it suitable for use, in some cases, where economical reasons forbid the installation



A Single Roller Mill.

of more elaborate plant or where other methods are not satisfactory. A problem that has been satisfactorily handled by the introduction of this single roller mill is that of reclaiming lost colour in linoleum factories. With certain inks and other materials it becomes necessary to maintain the working temperature between specified limits. The mill is so arranged that steam heating or water cooling may be fitted, if required, for this purpose.

Roll Mills for Pulverising

The well-established grinding method of the pestle and mortar are the underlying principles of the Griffin mill, made by the Bradley Pulverizer Co., of 37, Walbrook, London. In these mills a chilled iron roll-head revolves inside and against a steel die-ring rigidly held in a cast-iron mill bed. The roll-head is fastened to a shaft suspended from a universal joint in the pulley body at the head of the mill. The Griffin mill is essentially a single stage pulveriser, reducing material to the desired fineness in one operation without the use of any auxiliary sieving or separating appliances. They are adapted for reducing hard and wearing materials such as rotary kiln cement, clinker, silica rock, felspar, and manganese ores. The mills are made in the 40 and 30 in. sizes, and a new unit 24 in. in diameter has recently been produced.

Another and larger mill in the Bradley range is the Bradley three-roll mill, working on a similar principle to the above, but with three rolls instead of one. It is used for grinding such materials as coal for boiler firing, phosphate rock, etc. It is made either as a totally enclosed or as a partially enclosed machine, according to the degree of dustlessness desired.

British Sulphate of Ammonia Federation

Relation of Production to Consumption

THE eighth annual general meeting of the British Sulphate of Ammonia Federation, Ltd., was held at the Head Office, 30, Grosvenor Gardens, London, on Thursday, November 15. Sir David Milne-Watson (chairman) presided.

In reviewing the work of the year, the Chairman stated that there was a very large increase in the output of nitrogen in the world during the year. The actual figure was about 420,000 tons of pure nitrogen, equivalent to an increase of 34 per cent. While the increase in consumption was not sufficiently large to absorb the whole of the increased output, it amounted to the very satisfactory percentage of 22 per cent. There was only a moderate increase of about 4 per cent. in the world's consumption during the previous season, but taking the two years together there was an average annual increase of 13 per cent. This figure suggested that a cumulative increase was still continuing in the world's powers of absorption for nitrogen, for if they took the average percentage increases over the last four or five years the average figure is 11 per cent. Estimates which had recently been made regarding the consumption during the present fertiliser year, 1928–29, led them to expect a further considerable increase.

On the other side of the picture, however, they were faced with an increase in production of something like 22 per cent., assuming that the Chileans carried through their programme and produced 500,000 tons of pure nitrogen.

Unless their estimates for the increase in consumption were too conservative, it would appear that at the end of the present fertilizer year they would reach the position predicted some years ago, when the rate of increase in production would definitely outstrip the increase in consumption.

Prices

In view of the favourable statistical position in June, 1928, the chief nitrogen producers in the world decided to maintain the same level of price for nitrogen during 1928–29 as was obtained for the previous year. It could not be said that that level of price was satisfactory to by-product producers of sulphate of ammonia, but they would only be deluding themselves if they thought that any improvement in the price was likely to take place.

The Chilean nitrate propagandists had recently been taking comfort because the German Nitrogen Syndicate passed on a small increase in railway rate to their home consumers. It had been concluded that the margin of profit on the production of synthetic nitrogen in Germany was very small, and that, therefore, no further reduction in prices was likely to take place in future years. It seemed to him that this assumption was very rash and that the German Nitrogen Syndicate was much more likely to have been acting on the principle that any variation in railway rates which came into force after "delivered prices" had been declared should be passed on to the consumer. This was a principle on which they had often acted in this country, and on which they proposed to act this season if the railway companies reduced the rate on sulphate of ammonia carried as fertilizer for home agricultural use in this country.

Competition with Chilean Nitrate

The Chilean Government and the Chilean nitrate propagandists were making a determined effort to recover their lost markets. As a result of these efforts not only had the price of Chilean nitrate been very considerably reduced, but considerable improvements had been made in the method of sale. It would be foolish to ignore these efforts, and Nitram, Ltd., were taking active steps to counter them. They regarded Chilian nitrate of soda as an excellent fertilizer when used at the right time and place. But in the interests of farmer customers they must resist to the uttermost the claim made by the Chilean propagandists that Chilean nitrate was superior to all other nitrogen fertilizers.

Increased Exports of British Sulphate

Turning to export markets, a very remarkable recovery had taken place in British trade. Production had not yet completely recovered from the disaster of the coal stoppage and general strike of 1926, but the figures in the report showed that they had sufficient sulphate of ammonia to regain much lost ground in overseas markets. It was particularly gratifying that sales in Japan rose from 38,000 tons to over 100,000 tons during the year, and the fact that sales in China had again more than doubled led them to expect still greater developments in that market.

India and Ceylon

As regards India and Ceylon, he was pleased to report a substantial increase in the consumption, especially of sulphate of ammonia, which had now reached the respectable figure of 30,000 tons per annum. Last year, referring to the investigation of Indian agriculture by a Royal Commission, he expressed the hope that the Report of the Commission would indicate ways and means of facilitating the consumption and distribution of fertilizers in that country. Those who had read the Report of the Commission will no doubt share his feeling of disappointment. The passages relating to the place to be occupied by artificial fertilizers in Indian agriculture indicated an inadequate grasp of the problem on the part of the Royal Commissioners. Although the Commission had declined to recommend the adoption of the offer which was made by Nitram, Ltd., with the support of Imperial Chemical Industries, Ltd., he understood that their friends intended to pursue their programme. The attitude of the agricultural authorities in India has been very helpful.

The Home Market

In the home market they had done no more than mark time, but in view of the very difficult period through which farmers passed last season they could congratulate themselves that there was not a heavy fall in the consumption of nitrogen, and credit was due to the advisory service of Nitram for the fact that the falling-off in home consumption was so insignificant. Reports from the districts indicated that nitrogen was being applied to at least 50,000 acres of pasture land under the new system of intensive grassland treatment, and as this system became more widely adopted a very considerable increase would occur in the use of nitrogen at home.

Proposed Tax in Spain

The Spanish Government was proposing to pay a subvention to the existing makers of synthetic ammonia in Spain and to raise the necessary fund by the imposition of a tax, which would probably be heavy, on imported sulphate of ammonia. They had protested against this proposal through the proper official channels. They did not presume to criticise or object to the decision of the Spanish Government to protect the Spanish nitrogen industry, but they claimed that this protection should not be given at the expense of imported sulphate of ammonia alone, the bulk of which came from Great Britain. All they asked was that all forms of nitrogen imported into Spain should receive the same treatment.

The report and accounts having been adopted unanimously, and the auditors having been reappointed, Sir David Milne-Watson (Gas Light and Coke Company) was re-elected chairman, and Mr. E. J. George (Consett Iron Co., Ltd.), and Mr. S. Henshaw (Staffordshire Chemical Co. (1917), Ltd.), vice-chairmen of the company for the ensuing year.

The proceedings terminated with a vote of thanks to the staff, which was briefly acknowledged by the general manager, Mr. F. C. O. Speyer.

National Advertising Charity

THE A.D.S. Players (Advertising Dramatic Society) are producing on November 26 and 27, at the New Scala Theatre, "The Eternal Spring," by Peter Garland, in aid of the National Advertising Benevolent Society, under the patronage of the President (Sir Ernest Benn). Last year this youthful but vigorous band of players raised £300 for the great advertising charity and they hope this year to be able to hand over at least £500. Tickets are obtainable from the theatre box office, or from Miss L. A. Shaw, 63, Lincoln's Inn Fields, London, W.C.2.

British Association of Chemists

Annual General Meeting in Birmingham

THE annual general meeting of the British Association of Chemists was held on Saturday, November 17, at the University of Birmingham. Dr. G. T. Morgan (president) was in the chair, and there was a good attendance of delegates.

The report of the Council showed progress. The reserves of the Unemployment Benefit Fund were satisfactory, and fewer calls had been made upon it. The Legal Aid Department had dealt with many service contracts, and the Appointments Bureau had found situations for many members.

A resolution was passed providing for the substitution of the word "chemist" in various rules by the term "Chemist or Chemical Practitioner or Registered Chemical Practitioner."

Mr. F. Scholefield, M.Sc., F.I.C., one of the founders of the Association, was elected to succeed Dr. Morgan as president.

The membership of the Association was reported to be steadily increasing. Its members include research chemists, directors of large firms who are qualified chemists, industrial chemists in control of works and laboratories, public analysts, professors and teachers of chemistry. Its members number only about one-fifth of the chemists of the country, and it is at present the mainspring of the movement for the formation of an independent General Chemical Council and a legal Register of Chemists.

MR. F. SCHOLEFIELD, M.Sc., F.I.C.,
THE NEW PRESIDENT OF THE B.A.C.

Dr. Armstrong on the Magic Ring

The annual dinner followed at the Midland Hotel, Birmingham, about sixty chemists being present, including representatives of the Institute of Chemistry, the Society of Chemical Industry, and various kindred bodies.

The toast of the "British Association" was submitted by Dr. Armstrong, Consultant to Imperial Chemical Industries. "Long, long ago," he said, "before the days of plus fours and the shingle, when people did not even read Edgar Wallace, there was a young man, usually associated in our minds with a lamp, who happened to rub a magic ring, whereupon a spirit appeared before him and said, 'I am the slave of the ring, what do you wish me to do?' To-day many chemists are slaves of the ring, our mystic hexagon ring, which stands as the symbol for benzene—bound for the greater part of their lives to obey the law and order of the ring. Anyone can join the band if he gives the password and the greetings. It was Kekulé who first visualised it—in a dream, it is said. Baeyer and Armstrong and many another have shaped it, and in later years first Thiele and later Thorpe and Ingold and Robinson have not yet been able to let it alone.

"Concealed is our ring in a lump of coal; distilled out of the black rock by fire; we catch it in a tea cup, a sweet-smelling aromatic liquid. At the coke ovens the workmen treat it without reverence, little dreaming all that it may come to mean. True, it is only when we slaves, the chemists, get to work that the inward magic of the ring is revealed. Put it in your motor car; the engine knows and the steepest hill is climbed with glee. But this is an ignoble use. Rather do we work on the ring with potent acids and then with iron borings and obtain, as Béchamp did in 1852, aniline—though this was discovered just a hundred years ago by Unverdorben, who obtained it from indigo.

"And now the fun begins. A noble army of slaves with the classic and noble Perkin at their head and A. W. Hofmann close beside him, have twisted aniline this way and that, coupled it and fused it and what not, even submitting it to the final indignity of pressure. The consequence, you ask? A drab world has become bright, hues far surpassing the rainbow have been brought to the foot of him, or is it her, who rubbed the ring.

"Another rub of the ring, and who is this we see coming? Kolbe with Aspirin—surely every bottle should carry his portrait; Ehrlich with his specifics, and all those others who have created the vast domain of synthetic therapeutics—household names every one of them to us, their fellow slaves.

"An army of workers has passed before our eyes as we dream. We twist the ring and rub again and this time our ring has a round stone in it—of oxygen—most wonderful of all elements. Phenol, carbolic acid was found by Runge in tar in 1834. The slaves now wear factory suits, for sternly utilitarian has our ring become. Cresols to preserve the railway sleepers, road tar and pitch for binding and surfacing the roads, disinfectants and—— But stay, for some, as they pass, are detected by the nose and we can believe we are in the flower fields of the South, for our ring is responsible for synthetic perfumes.

"Now a twist again and all that is wrought of artificial resins is placed to our hand. But our brain reels; we have seen enough for to-day and so let us raise our glasses to 'The Ring.' May those prosper who love it and may God increase their number." (Applause.)

Dr. Morgan on the Association's Work

Dr. Morgan, in responding, pointed out that the Association was founded ten years ago, and its progress since then had been satisfactory. There was a membership of from 1,000 to 1,100, and this was steadily increasing. About 25 per cent. of their members were members of the Institute of Chemistry, and he believed that all past presidents had been members of that body. He hoped the relations between the Institute and the Association would become even more intimate, because the activities of the Association were in no way antagonistic to those of the Institute; they were rather complementary. In regard to unemployment the Association was doing a most useful work in securing employment for those who were unfortunately out of positions, and in providing unemployment benefits. On the subject of agreements, valuable guidance was also being afforded by the Association. The detection of anomalies in agreements might be of benefit both to chemists and to manufacturers. At the annual meeting that day, a good deal of attention had been given to a scheme for the registration of chemists. American chemists had demonstrated the advantage of one big chemical organisation. In this country chemists were rather apt to identify themselves with separate societies, but it seemed to him that the time had now arrived when the general body of chemists in this country should take a long view of the position, and do all they could in a practical way to promote union. After all, chemists were mortal, but chemistry was immortal. The great danger in having many societies was that they might become more anxious about their own existence than about the purposes for which they were originally established.

The toast of "Our Guests" was proposed by Dr. Levinstein, a past president of the Association, who congratulated the Association upon its steady progress. He agreed that it had thoroughly justified its existence. He recalled the time, early in its comparatively short history, when it was considered by some chemists to be barely respectable, owing to the extreme

views that were held by some of the members. That attitude of mind gave a certain spice to their movement, but there had been the inevitable toning down, and to-day the Association was in every way a thoroughly dignified institution. He coupled with the toast the names of Sir Charles Grant Robertson, Vice Chancellor of Birmingham University, Dr. Wardlaw, of the Society of Chemical Industry and the Birmingham University Chemical Society, and Dr. Webb, Principal of the Aston Technical College.

Sir Charles Robertson, in his reply, stated that ever since in his early days he was a student of chemistry, he had had a most profound admiration for chemists, and the wonderful things that they did, which were said to be only a fragment of what was going to be done. The important part which chemistry was playing to-day in the development of industry could hardly be exaggerated. He commended the work of the Association in that it made for unity and brotherliness and for the maintenance of a high standard of professional conduct.

Replying to the toast of "The Officers," Mr. Henry T. F. Rhodes referred to the enormous advance and possibilities of synthetic chemistry.

The New President—A Biographical Note

Mr. F. Scholefield, the new president of the British Association of Chemists, was educated at Yorkshire College (now the University of Leeds), 1900–1904. He is a graduate of both London and Manchester, and received the M.Sc. degree of the latter university in 1906. He is a Fellow of the Institute of Chemistry (serving on the council of that body, 1925–27), and a member of the council of the Society of Dyers and Colourists and chairman of the Society's Fastness Committee. From 1904 to 1926 he was engaged in the textile industry as a technical chemist in Norwich, Nottingham and Manchester. From 1912 to 1926 he was works' manager, and during the last five or six years of that period principal manager, of Burgess, Ledward and Co., Ltd., Dyehouse Department, Walkden. He resigned his position on being appointed to his present post of lecturer in applied chemistry (bleaching, dyeing, etc.) at the Manchester College of Technology (University of Manchester). He has been a member of the B.A.C. since its inception, and vice-president for some years.

More American Impressions

At an open meeting of the members of the Chemical Industry Club on Monday evening, presided over by Dr. Dehn (chairman), further impressions of the recent tour to Canada and the United States were given by six members of the party. The discussion was opened by Mr. F. E. Hamer, who contrasted British and American conditions and offered a number of conclusions concerning them, and was continued by Mr. G. S. Whitham, who dealt with the subject more from the political side and emphasised the importance of the delightful friendships formed during the tour; Mr. P. Parrish, who discussed the tour from the chemical engineering aspect, indicating that while the Americans excelled in handling, they appeared sometimes to sacrifice efficiency to throughput; Captain C. J. Goodwin, who dealt with American financial conditions and the speculative fever now prevailing there; J. M. Leonard, who contrasted the state of American and British workers, and suggested that on the whole the latter seemed the happier type; and Mr. F. A. Greene, who had compiled a humorous list of "Do's" and "Don't's" for prospective tourists and read such as he was able to decipher from his notes. In the discussion that followed, contributions were made by Dr. Percy May, Mr. F. M. Potter, and Dr. Duggan. The series of addresses, with their different points of view, afforded a very interesting collective survey and impression of the tour.

Nobel House for Disposal

Instructions have been received by Chesterton and Sons, of Kensington, in association with Grimley and Son, of Birmingham, from the directors of the Imperial Chemical Industries, Ltd., to offer at auction early in the New Year that important block of property known as Nobel House, Buckingham Gate. These premises will be sold together with the residential flats and shops immediately adjacent, the whole forming almost an island block. Illustrated particulars and plans are in course of preparation by the auctioneers. The staff of I.C.I. is now moving to Imperial Chemical House, Millbank.

Faraday Society's 25th Anniversary

Luncheon Held in London

To commemorate the twenty-fifth anniversary of the founding of the Faraday Society, a luncheon was held at the Jules Restaurant, Jermyn Street, London, on Friday, November 9, followed by the delivery by Sir Oliver Lodge, at the Royal Institution, of the first Spiers Memorial Lecture, the subject being "Some Debatable Problems in Physics." This lecture was delivered in accordance with the terms of a trust founded to keep alive the memory of the late Mr. F. S. Spiers, a founder of the Society, and its secretary and editor throughout the whole period of its history until his death on May 21, 1926.

Professor T. M. Lowry, F.R.S. (President of the Society,) was in the chair at the luncheon, which was attended by representatives of scientific societies from many parts of the world. Those present included Professor E. C. S. Biilmann (International Union of Pure and Applied Chemistry), Professor Ernst Cohen (also of the International Union), Senator G. Marconi (National Research Council of Italy), Professor K. Fajans (Bunsengesellschaft), Professor J. F. Thorpe (Chemical Society), Dr. K. Moltkehansen (American Electrochemical Society), Mr. Robert L. Mond (Royal Society of Edinburgh), Sir Robert Robertson, Mr. James Swinburne, Professor F. G. Donnan, Sir Frank Dyson (Institute of Physics), Dr. W. H. Eccles (Physical Society), Sir Robert Hadfield, Professor J. W. Hinchley, Dr. E. K. Rideal (American Electrochemical Society), Mr. C. C. Paterson, Mr. E. Hatschek, Dr. R. Lessing, Professor C. H. Desch, Mr. Emile Mond, Sir William Bragg, Dr. H. J. S. Sand, Dr. N. V. Sidgwick, Dr. B. A. Keen, Dr. E. B. R. Prideaux, Dr. H. Schofield, Sir Harold Hartley, Mr. J. Davidson Pratt, Dr. W. H. J. Vernon, Professor J. R. Partington, Mr. F. Twyman, Dr. E. W. J. Mardles, and Mr. G. S. W. Marlow (secretary of the Society).

International Goodwill

Professor Biilman proposed the toast of "The Faraday Society," and presented to the president of the Society a copy of two volumes of correspondence, between Oersted and the scientific societies and between Oersted and Faraday. Mr. James Swinburne responded to the toast. He said that a great deal of the success of the Society had been due to the late Mr. Spiers, who had shown a special aptitude for organising discussions.

The President, acknowledging the toast, said that as long ago as 1923, when he had the pleasure of inviting the Faraday Society to Cambridge, the fiftieth general discussion was celebrated. The success of these general discussions was largely due to the willingness with which distinguished scientists in other countries came here and took part in them. He expressed the hope that the international spirit would be fostered and developed.

Professor F. G. Donnan proposed "The Guests," and Professor K. Fajans and Senator Marconi replied. The former emphasised the value of the general discussions for which the Faraday Society had become so well known, and spoke of the great part played by science in promoting international goodwill. Senator Marconi expressed the goodwill of the National Research Council of Italy towards the Faraday Society.

Boots' Developments at Nottingham

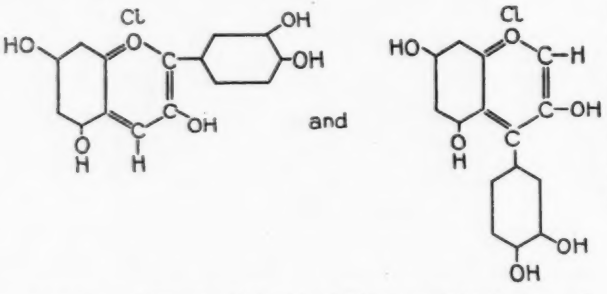
An industrial development of considerable importance is being carried out by Boots' Pure Drug Co., Ltd., which recently acquired a plot of land at Beeston covering 270 acres. This, it is understood, is to be laid out with new offices and factories. The object of the scheme is to centralise the activities of the undertaking, and will take some years. The site is on the far side of the railway, facing the new university and behind the recreation ground. The offices will face the railway, and the manufacturing departments will be directly attached to the packing departments, which will be connected with the warehouse, this department being in direct contact with the railway. Such a scheme will mean that labour in handling is reduced to a minimum. Work has already been begun on the new site, and the construction of the first factory in the new scheme—the soap factory—is well under way. The new factory, it is understood, will be a two-story building, approximately 192 ft. by 120 ft., and will have an output capacity in weight of soap three times as great as the present factory.

The Catechin Problem

To the Editor of THE CHEMICAL AGE.

SIR,—The correspondence which has appeared in your columns upon the above subject leads me to place on record a few points in connection therewith. It is perhaps interesting that the reaction which Dr. Nierenstein insists is of crucial importance (the production of a yellow oxidation product from cyanidin chloride) is the reaction which led the present writer to undertake the experimental work that enabled him to put forward for the first time the now generally accepted structural formula for the anthocyan colours (Everest, *Proc. R. Soc.*, 1914, B, **87**, 449).

In a few words, the position respecting the constitution of cyanidine is set out below. Following upon the present writer's producing anthocyans by the reduction of flavanols, and indicating the structural formula for the anthocyan series, Willstätter and his collaborators (who at first disagreed with the writer's results) confirmed that formula, produced cyanidine from quercetin and satisfied themselves as to the identity of the natural and the synthetic product. Dr. Nierenstein appears to ignore this method of synthetic preparation of the anthocyans, which is of special interest, as it was the first to distinguish between the two formulæ:



one or the other of which the brilliant analytical work of Willstätter and his collaborators had established as being the structure of the anthocyan nucleus, but analytical methods had failed to yield a definite decision between these. Since the above work, Willstätter and Zechmeister have synthesised pelargonidin, whilst the brilliant syntheses of Robinson and his collaborators in this country have added a number of cases in which the structure of various anthocyan compounds has been demonstrated to the hilt.

It appears that, despite all the evidence thus available, Dr. Nierenstein reverts to a small portion of the original paper by Willstätter and Everest (*Annalen*, 1913, **401**, 189) respecting the oxidation product of cyanidin. As the writer carried out this work, it may be of interest to set down a few points concerning it.

In his letter to your journal of October 20, Dr. Nierenstein writes:—

> "It is now generally agreed that Willstätter's well-defined yellow oxidation product is of crucial importance to the whole question. This product is given by the natural and not by the synthetic cyanidin."

It may be of interest to point out that the words "well-defined" were not used by Willstätter and Everest (compare page 231, l.c.). They state that:

> "Die Flüssigkeit wird gelb, durch Extrahieren mit Äther lässt sich ein Produkt isolieren, das schöne, hellgelbe Krystalle bildet und mit Alkalien tief gelbe Lösungen liefert."

As the actual experiment was conducted by the present writer, he can add that whilst crystals were undoubtedly obtained in the experiment referred to, the product was not obtained in quantity nor analysed. It was undoubtedly produced, and the *Annalen* describes accurately what was seen of it. The preparation was only qualitatively conducted, material not being available for determining accurately the process of production. In view of our extreme difficulty in obtaining cyanin chloride and cyanidin chloride crystalline until conditions were accurately determined, it is not very surprising that Professor Robinson may have failed to obtain crystals. If, however, Dr. Nierenstein would examine what Professor Robinson states on page 337 of your October 13 issue, he will notice that he states that Pratt and Robinson examined natural and synthetic cyanidin, and that they did obtain a *yellow oxidation product* in each case, as did Willstätter and Everest, although in *neither* case did Pratt and Robinson obtain crystals. In other words, according to Pratt and Robinson, natural and synthetic cyanidin chloride react similarly.

Dr. Nierenstein must realise from his wide experience of natural products that in dealing with such products as the pseudo bases of the anthocyanidins, which are so extremely sensitive to conditions, an oxidation of this character is liable to deviation with very small variations of procedure. If we were particularly fortunate in obtaining the uniform product in our rough experiments, it may well need a considerable amount of detailed work to reproduce the conditions under which crystals can be obtained, and it is to be regretted that Drs. Nierenstein and Malkin did not give details in their paper. As far as the writer's memory serves him the crystals we obtained were not "quite insoluble" in water as were Nierenstein and Malkin's. Numerous cases have occurred of this type in very much less delicately balanced operations.

Although new evidence may always throw light on old problems, which necessitates reconsideration of apparently decided cases, and one will await with interest the control experiments referred to by Professor Robinson, it rather appears that if the cyanidin chloride structure is still to be considered *sub judice* despite the analytical work available, coupled with the anthocyan synthesis originally carried out by the writer, the confirmation of that by Willstätter, the further syntheses of Willstätter and his collaborators, and the numerous and brilliant synthetic productions by Robinson, all of which are in agreement as to the constitution, then a large number of our most cherished organic structural formulæ must be in a similar state.—Yours, etc.,

ARTHUR E. EVEREST.

Huddersfield.

Customs General Bond

To the Editor of THE CHEMICAL AGE.

SIR,—You will no doubt have read with interest the particulars of Customs "General Bond" scheme as given in the British Chemical and Dyestuffs Traders Association's Bulletin No. 63. The introduction of the General Bond should do away with the continual hold-up of imports of non-dutiable chemicals which would otherwise be detained for test with the inevitable delay and demurrage charges and not infrequent annoyance to customers on account of late delivery. The benefits afforded by the General Bond to those members who import non-dutiable chemicals do not need to be emphasised.

Some firms, however, may consider it is doubtful whether it is worth while entering into a bond for £500, and it is on this point that I am taking the liberty to amplify the remarks given in the Association's Bulletin. In the first place I am advised that the full amount of the bond would *not* be forfeited in the event of an importer inadvertently entering dutiable goods as non-dutiable. The bond would only be held by Customs as security against the amount of duty payable in such circumstances, plus the usual fine which the department inflicts for "wrongful entry." The importing firm would be requested to pay the duty; the bond would only be put into operation in the event of a refusal to pay the amount demanded, plus the fine.

Secondly, it is understood that Customs have no desire to put members to unnecessary expense by demanding as surety a bond from an approved guarantee society. The department would be likely to consider as satisfactory surety the bond of the firm itself, in the names of two of its directors, especially if it is accompanied by a satisfactory bankers' reference. There is, therefore, little reason to think that firms who are members of this Association will meet with difficulty in fixing up a bond with Customs without the expense of providing as surety the bond of a guarantee society. It should cost them nothing.

The General Bond was approved by the department concerned solely on the representation of the Association that the continual hold-up of non-dutiable goods was causing heavy financial loss and doing serious harm to trade generally. It

is therefore hoped that every firm who is at all interested will adopt the scheme.

It is interesting to note that, during the past seven years, the Association has obtained for the trade the following facilities :—" Bonding " of K.I.D. goods, which has proved very useful for re-export business. " Exemption Orders " : the new Clause added to the Act providing for exemption from duty of those products not made here was the direct outcome of the Association's activities. " Declared Values " : for seven years the Association has insisted that there is only one legal and proper method of valuation and has resisted continual attempts to introduce other methods. The Association defeated two attempts to widen the scope of the Key Industry Act to cover a large number of industrial chemicals. It has recently caused the suspension by Customs of Form C 105, and, finally, it has secured the introduction of the General Bond scheme. For seven years the Association has been vigilant and active in protecting chemical merchants' interests in relation to the Key Industry duties and it is some satisfaction to be able to claim that its work has achieved such satisfactory results—On behalf of the Executive Council, Yours, etc.,

A. F. BUTLER, Chairman.

Fused Silica Ware

Mr. R. W. Clark's Lecture to the Sir John Cass Institute

" FUSED Silica and its Applications in Chemical Industry " was the title of a lecture delivered by Mr. R. W. Clark, A.M.I.E.E., sales manager of the Thermal Syndicate, Ltd., at the Sir John Cass Technical Institute, London, on Tuesday.

Although fused silica had been on the market for over twenty years, there appeared, said Mr. Clark, to be a considerable amount of ignorance of its limitations, and even its properties. It was well to emphasise the fact that fused silica was a definite chemical compound having a definite chemical behaviour, which might be forecast from a knowledge of the chemical properties of silica. It was at least 99·8 per cent. pure. The nature of the small amount of impurity might affect its physical behaviour, but did not appreciably affect its chemical properties. The coefficient of expansion up to 1,000° C. was 0·00000054. Above this temperature the expansion rate increased to a maximum of 0·0000012 per degree Centigrade at 1,100° C. It also possessed very little thermal hysteresis, had a high melting, or rather softening, point, and a high electrical resistance. Fused silica could not be used above 1,400° C.–1,450° C. without loss of shape. Devitrification took place when the material was heated for long periods at above 1,100–1,150° C., although higher temperatures might be used when heating was continuous. There was, however, a zone between 1,250° and 1,300° C. where fused silica could not be used. Substances such as potassium compounds acted as accelerators for devitrification. Metallic oxides at high temperatures were harmful, forming silicates with a rate of expansion different from fused silica.

Manufacturing Methods

The outstanding property of fused silica, said Mr. Clark, was its resistance to acids, hydrofluoric attacking it at about one-tenth the rate at which it attacked glass, while phosphoric acid attacked it slightly at high temperatures. The speaker went on to describe the manufacture of fused silica plant, saying that silica could only be worked above 1,650° C., and indicating that there were certain limitations on the size and shape of articles made of the material. Articles of a cylindrical shape were most easily made ; basin shapes might possibly possess walls of irregular thickness, while complicated branches could only be made by means of ground joints or by fusing pieces together. He pointed out that it was desirable to work with standard sizes of material, as the moulds for other sizes might add greatly to the cost. Hence in making out specifications an indication should be made of what variations were permissible.

As regards its applications in chemical industry, fused silica was well known for use in the concentration of sulphuric acid, the condensation of nitric acid, and the cooling and absorption of hydrochloric acid. The action of phosphoric acid was sufficiently small to render possible the use of fused silica vessels in manipulating this substance. Towards the end of the war fused silica was used in vessels for picric acid manufacture. It was also used in the manufacture of aluminium chloride, but not extensively. Crysilic acid had been handled in fused silica vessels, and the results obtained were said to be better than those with some other vessels.

The lecturer emphasised the difficulty experienced by the manufacturer in not knowing to what use the material might be put.

Making Joints

In dealing with the joining up of plant, the lecturer said this involved the use of various joints and cements. The best joint was the spigot and socket. A cement that did not set hard but had some " give " was best. For instance, with hydrochloric acid, it was advisable to support the spigot of one pipe so that it was slightly clear of the next, and then to pack in asbestos rope, filling almost to the top of the socket, and finally to keep it in place with a cement composed of asbestos 44 parts, tallow 4½, whiting 20, and boiled linseed oil 23. Another useful cement was made of powdered silica 10 parts, asbestos fibre 15, red lead 2, and boiled linseed oil 18. These were not suitable for sulphuric acid, for which purpose a cement of sodium silicate (40° Tw) and whiting should be used. The whiting might be replaced by ground silica, to which barium sulphate might be added. The asbestos used must be pure, as otherwise the joint might burst. Flanged joints could be used, but were not easy to make. A connection between metal and silica might be made with stuffing glands. Ground joints for small diameter tubes could be used satisfactorily if there were no relative movement between the two pipes, and were essential for vacuum work. Valves and cocks were too difficult to make commercially. One method of getting over this difficulty was described. A plate with machined faces slid between two pipe sections, held together with clamps, the bolt of one of which formed a pivot for the plate, which had a hole in it through which the liquid could pass.

In his concluding remarks the lecturer said that although sometimes orders for large pieces of fused silica had to be refused, this was not owing to any inherent difficulty in manufacture, but simply because there was not yet a large enough demand to make profitable the production of such pieces. They were doing all they could to overcome the present limitations, and there was no doubt that progress would continue to be made.

Producer Gas as Motor Fuel

IN a statement regarding the possible use of producer gas as a cheap fuel for motor transport, Mr. H. W. Gepp, the chairman of the Australian Development and Migration Commission, said that considerable interest attached to the tests recently carried out on a two-ton British producer-gas motor vehicle. It was found that slightly more than 1 lb. of charcoal was consumed for each useful ton mile. A small quantity of petrol was required for starting purposes only. The amount of water consumed by the producer was between 0·125 lb. and 0·25 lb. for each pound of charcoal. From a power point of view, no trouble was experienced with the machine, which performed the work as effectively as a similar petrol vehicle. It was found, however, that considerable difficulty was experienced in starting, and also that charcoal dust escaping from a portion of the plant was detrimental to clean carriage of freight. The makers' representative has intimated that these objections had been overcome.

Suggested Prohibition of Black Smoke Emission

A COMMUNICATION has been received by a number of West Riding authorities from the Minister of Health stating that he will be prepared to sanction a by-law prohibiting the emission of black smoke from industrial chimneys for more than three minutes during any continuous period of thirty minutes. After a trial of the by-law for three years the Minister of Health will be prepared to consider an application for the restriction of the period of emission to two minutes. The decision follows an inquiry conducted at Bradford last July, at which twenty local authorities applied for confirmation of a by-law under the Public Health (Smoke Amendment) Act of 1926, providing for the restriction of the emission of black smoke to a period of two minutes. The inquiry was regarded as a test inquiry, and the Minister's decision is in some quarters regarded as indicative of a standard for the whole country.

Autumn Meeting of the Institute of Fuel

Lord Melchett's Presidential Address

Delivering the presidential address at the autumn meeting of the Institute of Fuel on Tuesday, the president, Lord Melchett, F.R.S., said that this was the last time he would address them as their president, for Sir David Milne-Watson had consented to accept the presidency; but as their founder-president he would do all he could to further the interests of the Institute.

THE fuel and coal industries of the country, said Lord Melchett in his address, were unbalanced, and although good in some parts, were in a bad condition in others. Looking back on the history of Britain, it was evident that coal was a comparative newcomer in the national life. The industrial revolution and the general use of iron as a substitute for wood gave a great impetus to the coal trade. Britain took the lead because besides inventive genius she had energy and practical application. She had the great natural advantage of coalfields near the sea, and iron at reasonable proximity to the coal. This lowered export costs of manufactured products and developed the export coal trade.

Modern Tendencies

The first phase of the industrial revolution had spent its force, the second was well on its way towards practical results. Let them contrast modern tendencies in progressive industry with the spectacle of three thousand independent collieries, each working its own pits in its own way. They in the Institute of Fuel were continually endeavouring to make substantial economies in the use of fuel. Britain used in manufacturing, in collieries themselves, in domestic consumption, and in railways a very large proportion of her home consumption. They all knew that the amount used in these categories could be greatly decreased, and were steadily attacking the problem.

Steam generating plants, for example, were constantly increasing their pressures; a new boiler plant under erection in one of the factories of Imperial Chemical Industries would shortly generate steam at a higher pressure than any other in the country, and produce electricity cheaper than anywhere in the world.

The coal trade was faced with the problem of tiding over the present period of disorganisation and over-production in such a way that the world's output of coal when used with the greatest economy would satisfy its needs. The formation of the Fuel and Power Committee, of which he was chairman, showed that the country was taking the fuel question seriously. He wished particularly to draw their attention to the suggestion contained in the Fuel and Power Committee's report that the coke oven industry should centralise their research.

Various Movements

Particular movements, both technical and otherwise, called for comment. Powdered fuel plants were on the increase. A great public utility company had taken up the Coalite low-temperature carbonisation process. Coal should be sold in a better classification, there should be a standardisation in screening. He would like to draw their attention to Dr. Lessing's coal cleaning method which was being operated by one of the companies in which he was interested. The process depended upon the relative densities of the wanted and unwanted portions of coal in a suitable medium. Contrary to expectation, no difficulties in removal of the flotation medium had been experienced. Coke made from coal thus cleaned was low in ash and reduced production costs in pig iron.

The combustion engineer nowadays was an important person. Much greater attention was devoted not only to his training but to the training of all fuel personnel. The Institute of Fuel had instituted a Fellowship that was a real mark of technical distinction. The regulation had been drawn up so as to include both academic and technical ability. The Institute owed a debt to Professor M. W. Travers, F.R.S., the chairman of the committee, who had drawn up the Fellowship regulations.

The World Problem

Lord Melchett urged that the coal problems of the world were one. A particular country might have a particular disadvantage, but if they examined the question closely they would find that frequently there were compensating advantages. The main factor in the re-establishment of the coal industry of this country on a sound economic basis was its internal reorganisation in technology, commercial directions, and labour relations, followed by Imperial and international reorganisation and agreement. Countries like their own which depended upon export to a considerable extent, would have to make an arrangement with other coal-producing countries. Internal reorganisation should take place promptly. In what other industry would unproductive units be tolerated such as were seen in the coal trade the world over?

The general fuel problem facing this country was an extremely complicated one. They were frequently faced with the rival claims of gas and electricity. There should be no such rivalry. There was another side of the coal problem which had not received sufficient attention. Someone years ago had called coal carbon. But coal was anything but that. The first of the problems depending on the fact that coal was not carbon, but a complicated hydrocarbon, was already being attacked with energy. He was referring to the conversion of coal into oil, which would undoubtedly yield an economic solution in the next decade. Further, the problem of the direct employment of coal for what it was, namely, a complicated chemical substance, was as yet in its infancy.

Concluding, Lord Melchett said that he need not mention again the truism that any revival in the coal trade would have direct and immediate effects upon the general prosperity of industry and of the whole country. How was such a revival to be brought about? He had already suggested that technology, commercial reorganisation, and industrial co-operation were those directions in which the fateful course of British industry, and particularly the British coal industry, might again tread the path of progress and prosperity. Along these directions, that revival in trade and commerce which the country and its population, employed and unemployed, so earnestly desired and so wistfully looked for, might be achieved.

Institution of Chemical Engineers: Elections

THE following is a list of newly-elected members:—

Members.—Harry Julius Bush, M.Sc., Ph.D., managing director, Huntington, Heberlein and Co., Ltd., director and London manager, Lodge-Cottrell, Ltd.; Herbert William Cremer, M.Sc., F.I.C., Senior Lecturer in Chemistry, King's College, London; Leo Frank Goodwin, Ph.D., F.I.C., A.C.G.I., Professor of Chemical Engineering, Queen's University, Kingston, Ont.; John Hanley, F.I.C., chief chemist, J. Bibby and Sons, Ltd., Liverpool; Barton Parkinson Hill, M.Sc., technical advisor to the Blaydon Manure and Alkali Co., Newcastle-on-Tyne; George Speede Park, engineer, British India Electric Construction Co., Ltd., Calcutta; Ralph Oliver Phillips, M.Sc., chief chemist, Forestal Land, Timber and Railways Co., Ltd., Harpenden; Thomas Fred Eric Rhead, M.Sc., F.I.C., chief chemist, Birmingham Gas Dept.; James Strachan, F.Inst.P., general manager, British Vegetable Parchment Mills, Ltd., Northfleet.

Associate Members.—Claud McClellan Bottomley, B.Sc., works manager and head brewer, Blackburn Brewery Co., Ltd.; Harold Hunter, D.Sc., F.I.C., British Cotton Industry Research Association, Didsbury, Manchester; Francis Kenneth Sinclair, B.Sc., assistant general manager and engineer, Colne Valley Water Co.; John Cuthbert Swallow, Ph.D., B.Sc., research laboratories of Brunner Mond and Co., Ltd., Northwich; Robert Alfred Victor Tayar, B.Sc., A.I.C., research chemist, John and E. Sturge, Ltd., Birmingham.

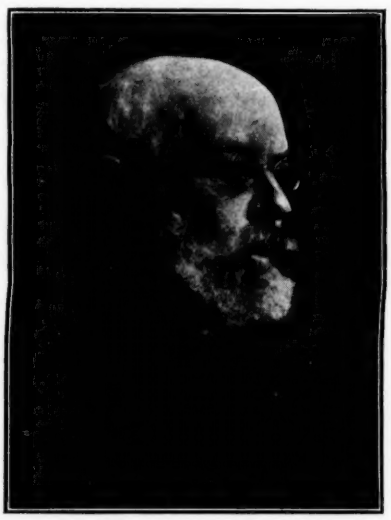
Graduates.—Kaushal Kishore Bhargava, B.Sc., A.R.T.C., Indian Government Technical Scholar for the Study of Sugar Manufacture; Horace Edward Cooper, assistant engineer, Chemical and Metallurgical Corporation, Runcorn; Jack Eliot Duckham, technical assistant, Alexander Duckham and Co., Ltd.; Eric Hadfield Lewis, M.Sc., instrument engineer, Brunner Mond and Co., Ltd., Northwich; John Sharp Smith, B.Sc., A.R.C.S., D.I.C., works chemist, Gas Light and Coke Co., Nine Elms Lane; Terence Spikins, B.Sc., plant operator, Woodall-Duckham Co., Ltd.; Daniel Thomas Phillips, chemical engineer, Rational Carbonisation Syndicate, Ltd., London.

Student.—Ronald Mason, articled pupil, Kendal Gas and Water Department.

Death of Mr. W. G. Blagden

THE news of the death on November 17 of Mr. William George Blagden, at the age of 89 years, at his residence at Petersfield, Hampshire, will be read with much regret by his many friends in the gas and chemical industries.

Mr. W. G. Blagden was born at Warmsworth, Yorkshire, in 1839. He was educated at University College, London. Later he went to Liege University, Belgium, and then to Freiburg University, Germany, securing mining engineering degrees. His commercial activities commenced in 1862, and he was probably the first maker of benzol in England at the time he owned the works of Carless and Blagden (now Carless, Capel, and Leonard). In 1870 he started business in the City



MR. W. G. BLAGDEN,

of London as W. G. Blagden and Co., entering into partnership in 1872 under the title of Blagden and Angus. Upon the latter's retirement in 1883 he was joined by his son, Mr. Victor Blagden, the present chairman of Victor Blagden and Co., Ltd. The last few years of Mr. W. G. Blagden's commercial life were spent with the Gas Light and Coke Co.

Besides his knowledge of chemical and engineering matters Mr. Blagden was an excellent linguist, speaking four or five languages fluently. The passing of Mr. Blagden breaks still another of the few remaining links with the pioneer days of the gas and chemical industries, in which he was an outstanding and highly respected personality.

Low Temperature Carbonisation, Ltd.

Chairman's Optimism at Annual Meeting

THE annual general meeting of Low Temperature Carbonisation, Ltd., was held on Monday in London. Sir Arthur Wheeler (the chairman), who presided, said that during the year the general position of the company's finances had been greatly improved even without taking into consideration anything in respect of the appreciation of goodwill which had arisen out of the very great progress that had been made both technically and commercially in connection with the manufacture and marketing of the company's chief product "Coalite." He wished to make it clear that the process itself was undoubtedly very profitable, and dealt with small coal in a way to give a far better return than any other known system; washed smalls could be bought for 9s. per ton at the pit, and the total all-in cost of treatment was 13s., against which they received for the products Coalite, coal oil, and motor spirit just about double that figure, without taking credit for the gas, which if sold to a gas company at only 2d. per therm as against 6d. or 7d. per therm charged by the gas companies, would yield a further profit of 2s. 6d. to 3s. per ton. He wished to reiterate and emphasise that the company was producing Coalite and oils readily saleable at prices which left a very substantial percentage of profit.

Chemical Matters in Parliament

Radium

In reply to Sir Harry Britain (House of Commons, November 19) Sir Kingsley Wood said that the whole question of the radium requirements of this country in relation to present sources of supply was at present under consideration by a sub-committee of the Committee of Civil Research.

Scottish Agricultural Industries, Ltd.

New Scheme Sponsored by I.C.I.

FOR some time past rumours have been current to the effect that steps were being taken to bring together the principal fertiliser and feeding stuffs manufacturers of Scotland. Negotiations have reached such a stage that it is now announced by Imperial Chemical Industries that a company, to be designated Scottish Agricultural Industries, Ltd., is in course of formation and will acquire the greater part of the capital of the following companies:—Alexander Cross and Sons, Ltd., of Glasgow; Cross's Chemical Co., Ltd., of Falkirk; J. and J. Cunningham, Ltd., of Leith; John Miller and Co. (Aberdeen), Ltd.; Charles Tennant and Co. of Garnoustie, Ltd.; and Daniel Wyllie and Co., of Ayr.

The nominal capital of Scottish Agricultural Industries will amount to £1,750,000, and the issued capital, which is not yet finally settled, will be approximately as follows:—6 per cent. cumulative preference shares of £1 each, 550,000; ordinary shares of £1 each, 800,000; and deferred shares of £1 each, 320,000. The scheme has been prepared by Imperial Chemical Industries, Ltd., who are taking a substantial interest in the new holding company. The directorate of the new company is an influential one, under the chairmanship of Sir Harry McGowan, president of Imperial Chemical Industries. The registration will shortly be effected in Edinburgh, and the vendor companies will be taken over as from January 1, 1929.

Object of the New Organisation

It is hoped that this new development will contribute in a practical way towards the solution of the farmer's present difficulty of reducing his costs of production. There can be no doubt that the agricultural industry is going through a period of depression that is world-wide, and it is difficult for any official or palliative measures to lead to better results under such conditions. It remains, therefore, for the industry itself and for those associated with it to take all possible steps to reduce the cost of production in any direction where this appears practicable. There have been several recent developments in the manufacture of fertilisers. Nitrogen compounds are being produced from the air at the Billingham Works of I.C.I., and this has already resulted in lowering the price of all nitrogenous fertilisers. The process entails enormous capital expenditure which cannot be faced by small undertakings. Developments, again, are at hand whereby it will soon be possible to supply complete fertilisers containing all the necessary ingredients in a highly concentrated form.

Individual companies in times of depression have to keep their works going on a restricted and often uneconomical output; and further, in order to maintain their separate positions they have to duplicate expenditure in distribution and in overhead charges which might otherwise be saved. Scottish Agricultural Industries, Ltd., will be able to deal with all these problems, and its intended policy is to restrict its dividends within reasonable limits with the object of benefiting its consumer customers in the future.

The merger companies will have direct representation by means of their branches and subsidiaries in almost every local market in Scotland from the Pentland to the Solway Firth. Representatives of the constituent companies will as far as possible continue to deal with their old customers, and thus develop their existing trade in fertilisers, feeding stuffs, agricultural seeds, home grown grain and all farm requisites and products. Scottish Agricultural Industries, Ltd., will have at its disposal vast manufacturing and research resources, and the pooling of the energies, experience and organisation of the leading firms in Scotland should result in placing the manufacture and marketing of fertilisers and feeding stuffs in that country on a rational and economic basis.

From Week to Week

MR. L. C. HARVEY is to visit New Zealand, in order to determine the possibilities of low-temperature carbonisation in that country.

THE U.S. TARIFF on potassium permanganate has been increased from 4 to 6 cents per pound, the increase taking effect on December 6.

BENZOYL-MORPHINE is to be scheduled under the Dangerous Drugs Act, and a licence will in future be required for its manufacture and sale.

BERYLLIUM of 99.5 per cent. purity is now said to be produced in Germany but it is not known whether this refers to large scale production.

MR. D. GARDNER, chemical engineer, of Stockton-on-Tees, was married in Paris on Sunday to Mlle. M. Chaliapin, daughter of the famous Russian singer.

BLASTING OPERATIONS have been begun preliminary to the work of laying the base of the new smelter of the International Nickel Co. at Copper Cliff, in the Sudbury district of Ontario.

THE SPANISH POTASH DEPOSITS recently discovered in the provinces of Aragon, Navarra, and Catalonia, near the Pyrenees, are (states a German report) undergoing investigation by Imperial Chemical Industries.

SPECIAL MACHINERY is being installed at Bridge Hall Paper Mills for the manufacture of viscose paper, to be used for wrapping chocolate, tobacco, foodstuffs, and delicate goods. The factory, which will probably be in action shortly, will employ 200 workers.

THE SHARES of the E.I. du Pont de Nemours Co., of the United States, are to be split up on the basis of three and a half for one. An extra dividend of $4·75 per share and $2.50 on the common stock is to be paid on the present shares, representing a cash disbursement of $20,380,000.

CONTINENTAL WASTE FOOD PRODUCTS will purchase on favourable terms the businesses of J. Lehaye and Co., with four factories in Belgium, and the "Société en nom Collectif Gauverit Père et Fils," with a factory near Brussels. This will give the company virtually a monopoly in Belgium in the collection of such products.

THE REPORT of L. and N. Brown Coal for the period June 14, 1927, to June 30, 1928, states that the period has been devoted to the development of the company's property in Australia. Agreements have been entered into for the erection of the first L. and N. distillation plant in Tasmania.

THE DRAYTON REGULATOR and Instrument Co., Ltd., state that their notice of the withdrawal of the "V.P. Welldeck" steam trap appears to have been taken in some quarters to refer to the "Standard Welldeck" steam trap. This is incorrect, and we are informed that the "Standard Welldeck" trap is being produced in increasing quantities.

UNIVERSITY NEWS.—*Manchester:* The Council have made the following appointments in the Faculty of Technology: Special lecture in applied chemistry, Mr. Morris Kolker; demonstrators in applied chemistry, Mr. D. C. Rhys Jones, Mr. J. M. Preston, Mr. H. Shaw, Mr. J. Hannon—*Sheffield:* It is announced that the Ironmongers' Company of London has decided to found a research fellowship and two research scholarships for the study of the cold working of metals, and a laboratory will be erected in the Applied Science Department.

A COMPANY for converting waste food products into cattle food will, it is announced, utilise the factory at Upton Towans, Gwithian, Cornwall, on a portion of the site formerly occupied by the National Explosive Works. The machinery required for the purpose necessitates large buildings, and extensions will be made to those now existing, but a suitable outfall from the factory to the sea is already in being, having been constructed some years ago at a cost of several thousands of pounds. An expenditure of £50,000 is projected in connection with the enterprise, and precautions are to be taken with a view to preventing the emission of fumes and obviating any objectionable features to residents and visitors. The scheme has been explained to the Gwithian Parish Council by Mr. C. Cardell Williams, and the authority has passed a resolution welcoming the proposed establishment of the factory.

HERBERT C. LOWKE, who was injured on November 7 in an explosion during the drying of some dyestuffs at Brotherton's Mersey Chemical Works, Bromborough, died in hospital on the Saturday following. At the inquest on Friday, November 16, Mr. G. E. Smith, plant manager, said that it appeared that an explosion took place at the back of a dryer. One tray was forcibly thrown from the dryer and across the building, and wrapped itself completely round a pipe. He could give no explanation of the explosion; possibly some foreign substance had become mixed with the material and acted as a detonator. They had dealt with 250,000 lb. of the material, which was not explosive, with perfect safety. The jury returned a verdict of "Accidental Death." It was announced during the inquest that Brotherton and Co. had decided that until the cause of the explosion had been determined, so that suitable precautions could be taken in future, the production of the material would be discontinued.

GERMAN POTASH SALES in October totalled 71,000 tons, only half those of the previous month.

IMPORTS OF DRUGS, CHEMICALS and fertilisers into Rhodesia in 1927 were valued at £333,600.

AMERICAN MERCURY PRODUCTION for 1927 is given at 11,276 flasks of 75 lb. The 1928 production is estimated at 15,000 flasks.

TWELVE PEOPLE WERE KILLED and a number injured in an explosion at a cartridge factory at Vincennes on Tuesday.

MR. W. J. GARNER has been appointed to the board of the British Cement Products and Finance Co., Ltd.

INDIAN INDIGO EXPORTS in September amounted to 103 cwt., as compared with 7 cwt. in August, 1928, and 254 cwt. in September, 1927.

THE GERMAN STATE POTASH COUNCIL has decided that the prohibition on the sinking of new pits shall be prolonged for three years.

GERMAN IMPORTS of sulphur in the first six months of 1928 amounted to 47,773 tons, of which 43,000 tons came from the United States.

THE KAOLIN-OSMOSE A.-G., of Czechoslovakia, is taking over the Allgemeine Keramische Elektro-Osmose A.-G., and is increasing its capital for the purpose.

CONSIDERABLE DAMAGE was done by last week's gale to the by-product plant which is being erected at Trethomas, South Wales, for a subsidiary company of the Bedwas Navigation Co., Ltd.

MR. K. N. WELCH, A.I.C., formerly engaged in research work at Armstrong College, Durham University, has taken up his duties as demonstrator in organic chemistry at Melbourne University.

THE GLASGOW CORPORATION Gas Committee has recommended the acceptance of a tender by S. Denison and Sons, Ltd., of Leeds, for a weighbridge for Provan Chemical Works, at a cost of £325.

DR. H. P. STEVENS, of the Rubber Growers' Association, will deliver a public lecture on "Rubber and Its Applications in Chemical Engineering," at the Sir John Cass Technical Institute on December 3, at 8.15 p.m.

A NEW ANGLO-GERMAN cellulose company, to be known as Waldhof, Ltd., has been granted registration by the Finnish Government. British investors have taken 50 per cent. of the capital, and are making a loan of £500,000.

A NOTIFICATION of the Iraq Government states that as from September 1, 1928, the Government has accepted applications for patents and grant patents thereon under the Turkish Law of Patents, 1880, as in force in Iraq. Applications must be made to the Ministry of Finance at Bagdad.

IT IS STATED by the attorney of the New Zealand Sensible Heat Distillation Co., that the company has no intention of importing L. and N. fuel into New Zealand, but is endeavouring to discover the extent to which a process can be developed in the Dominion by the treatment of New Zealand lignite and bituminous coals.

AN EXTRAORDINARY general meeting of the British Match Corporation, Ltd., will be held shortly to authorise an increase of £2,500,000. There will be no public issue but an offer will be made to shareholders in Bryant and May (Brazil), Ltd. to exchange their shares for new shares in the British Match Corporation, Ltd.

IN THE COURT OF APPEAL, on Tuesday, November 13, before Lords Justices Scrutton, Lawrence, and Sankey, Mr. Arthur Farnsworth, a farmer, of Barton-on-Irwell, appealed from the judgment of Mr. Justice Talbot, given at the Assizes, dismissing the action which he brought against the Manchester Corporation for an injunction to restrain the Corporation from so working their district electrical power station at Barton-on-Irwell as to emit fumes heavily charged with sulphur and sulphur compounds, to the damage of property in the occupation of Mr. Farnsworth, and interfering with his comfort and health. Defendants admitted the nuisance, but contended that they were protected by an Act of Parliament. The hearing of the appeal ended on Friday, November 16th, judgment being reserved.

AN INQUEST was held on Thursday, November 15, on Bennett Wilkinson, aged 38, who was employed by the Gas Light and Coke Co. at the Nine Elms Depot, in the retort house. Until March of this year he was a miner. His death was attributed to the unusually high temperature in London on the previous Sunday and Monday. Dr. Isaac Jones, of St. Thomas's Hospital, said that he went to the Air Ministry and discovered that the humidity of atmosphere on the Sunday was the highest on record for 48 years. Wilkinson was not tuned up to the particular work he had been doing in his new job. Dr. H. B. Weir, pathologist, said that the cause of death was syncope, following a heat stroke. The coroner, recording a verdict of death by misadventure, said that Wilkinson was the victim of the unique high temperature with humidity in the atmosphere. He was satisfied that the retort house was properly ventilated.

Obituary

MR. W. G. BLAGDEN, well known in the gas and chemical industries, on Nov. 17, aged 89. An extended obituary appears on another page.

References to Current Literature

British

CHEMICAL ENGINEERING.—Filtration equations for compressible sludges. A. J. V. Underwood, *J.S.C.I.*, November 16, pp. 325–329T.

COAL.—The X-ray examination of coal sections: Preliminary note. C. N. Kemp. *Proceedings Roy. Soc. Edinburgh*, Vol. XLVIII, Part 2, pp. 167–176.

COLLOIDS.—Further studies on colloidal gold. H. Nicol. *J.S.C.I.*, November 16, pp. 343–344T.

GENERAL.—On the oxidation of cholesterol by molecular oxygen. G. Blix and G. Löwenhielm. *Biochem. Journal*, Vol. XXII, No. 5, pp. 1313–1322.

Manufacture of solid carbon dioxide. *Industrial Gases*, September, pp. 130–135. Describes the first complete plant for the production of solid carbon dioxide erected in this country, at the works of T. Wall and Sons, ice-cream manufacturers, Acton, London.

INSULIN.—The destructive action of heat on insulin solutions. A. Krogh and A. M. Hemmingsen. *Biochem. Journal*, Vol. XXII, No. 5, pp. 1231–1238. The destruction of insulin at constant temperature is found to follow the monomolecular law, being at any moment proportional to the concentration; the rate of destruction is not appreciably altered by shifts of *p*H when this is between 2 and 4.

United States

ACCELERATORS.—Some observations with ultra-accelerators. A. D. Cummings and H. E. Simmons. *Ind. Eng. Chem.*, November 1, pp. 1173–1176. Tests with tetramethyl-, tetraethyl-, dimethyl-, dimethyldiphenyl-, and dimethyldiethyl-thiuram disulphide, with tetramethylthiuram monosulphide, and with zinc dimethyl- and diethyl-thiocarbamate, on the curing and ageing of rubber.

BEET-SUGAR.—Automatic control of the carbonatation process in beet-sugar manufacture. R. T. Balch and J. C. Keane. *Ind. Eng. Chem.*, November 1, pp. 1148–1151. An automatic control (for the second carbonatation) functions on electrometric principles whereby the e.m.f. produced between tungsten and calomel electrodes immersed in the juice, varying with the *p*H of the juice, causes the electric motor connected with the gas valve to operate indirectly through a system of relays. If sulphur dioxide were delivered to the sulphitation station under constant conditions a similar automatic control would be possible.

CATALYSIS.—Sixth report of the committee on contact catalysis. R. E. Burk. *J. Phys. Chem.*, November, pp. 1601–1645.

Behaviour of zinc oxide and zinc oxide-chromium oxide catalysts in the decomposition and synthesis of methanol. H. H. Storch. *J. Phys. Chem.*, November, pp. 1743–1747. The addition of chromium oxide to a zinc oxide catalyst in certain proportions increases the activity of the catalyst for methanol synthesis, but does not affect its activity for methanol decomposition at atmospheric temperature.

CHEMICAL ENGINEERING.—Automatic control through temperature or pressure. C. J. Swan. *Ind. Eng. Chem.*, November 1, pp. 1152–1155.

GENERAL.—Dufton distilling column for the preparation of absolute alcohol. W. A. Noyes. *Ind. Eng. Chem.*, November 1, pp. 1191–1192. Alcohol may be raised to 99·7 per cent. strength by distillation over calcium chloride through a Dufton column.

Hydrogen-ion control in water-softening. J. R. Baylis. *Ind. Eng. Chem.*, November 1, pp. 1191–1194.

Olive oil and its substitutes. C. H. LaWall. *American Journ. Pharmacy*, October, pp. 616–625.

The colouring matter of cottonseed hulls. A. H. Gill and H. W. Greenup. *Oil and Fat Industries*. October, pp. 288–294. A new reddish-brown substance, of formula $C_{19}H_{33}O_{21}$ has been isolated from cottonseed hulls.

The action of selenium monochloride upon fatty oils. E. H. Harvey and H. A. Schuette. *J. Amer. Chem. Soc.*, October, pp. 2837–2840. The use of selenium monochloride as a test for fatty oils is found to be impractical, owing to the decomposition of the reagent.

ORGANIC.—Indene and styrene: Crude materials in industrial quantities. R. L. Brown. *Ind. Eng. Chem.*, November 1, pp. 1178–1180. Fractional analyses of thirteen representative samples of the oily condensate (drip oil) from carburetted water-gas mains, etc., are presented. In fresh, dry oil, the indene content is about 35 per cent., and the styrene content about 15 per cent. The potential annual supply (in the United States) is about 8,000,000 lb. of styrene and at least twice that of indene. Both hydrocarbons offer great industrial possibilities.

New organic salts of telluric acid. F. R. Greenbaum. *American Journ. Pharmacy*, October, pp. 630–635. The tellurates of hexamethylenetetramine, thiourea, urea, and piperazine hydrate have been prepared.

The relative rates of absorption of the gaseous butenes into sulphuric acid. H. S. Davis. *J. Amer. Chem. Soc.*, October, pp. 2780–2782.

The relative rates of bromination of the olefines. H. S. Davis. *J. Amer. Chem. Soc.*, October, pp. 2769–2780. The olefines brominate at very different rates in carbon tetrachloride. Light increases the rate of bromination of the olefines, but decreases the relative differences between them.

VISCOSE.—Researches on cellulose xanthate and viscose. The changes of the colloidal nature of viscose with the concentration of free alkali. K. Atsuki, I. Okamura, and T. Matsuda. *Rayon and the Rayon Journal*, October 1, pp. 29, 41–42.

VITAMINS.—Vitamins and vital elements. J. E. Rutzler, jr. *Oil and Fat Industries*, October, pp. 295–301. Puts forward the view that the action of vitamins, within certain limits, may be due to their inorganic constituents.

German

CHEMICAL ENGINEERING.—The organisation of operations and rationalisation in repair shops in the chemical industry. A. Jakob. *Chemiker-Zeitung*, November 14, p. 887.

FIRE EXTINCTION.—Recent foam extinguishers. J. Hausen. *Chemische Apparatur*, October 25, pp. 232–233.

GENERAL.—The fundamentals of alcohol-benzene distillation under pressure, for the production of anhydrous alcohol. O. von Keuszler. *Chemische Apparatur*, September 25, pp. 205–207; October 25, pp. 233–234.

The reducibility of thorium oxide by hydrogen. B. Segall. *Chemiker-Zeitung*, November 17, p. 897.

A new method for the separation of alcohols and phenols from oil mixtures. H. Schmidt. *Chemiker-Zeitung*, November 17, p. 898.

The chemistry of calcium compounds. E. Donath. *Chemiker-Zeitung*, November 14, pp. 885–887. Calcium-magnesium oxide; the question of the existence of basic calcium carbonate.

The removal of tar fogs from gases. L. Eck. *Chemische Fabrik*, November 14, p. 657.

The by-products of gas manufacture, and their importance in the chemical industry. H. Tiemessen. *Zeitschrift angewandte Chem.*, November 17, pp. 1242–1244.

Miscellaneous

INORGANIC.—Manufacture of potassium ferrocyanide. Manufacture of barium nitrate, strontium nitrate, sodium fluoride, and zirconium oxide. J. Frère. *Revue Produits Chimiques*, October 15, pp. 697–698, October 31, pp. 733–738 (in French).

OILS.—A further study of the vulcanisation of oils.—II. P. Stamberger. *Recueil Travaux Chimiques Pays-Bas*, November 15, pp. 973–976 (in English).

ORGANIC.—The mechanism of the oxidation of some carbohydrates and polyhydric alcohols by hydrogen peroxide with iron salts as catalysts in acid media. A. T. Küchlin and J. Böeseken. *Recueil Travaux Chimiques Pays-Bas*, November 15, pp. 1011–1026 (in English).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

298,704. OXIDISING PARAFFINS, WAXES, ETC. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 22, 1927.

Paraffin hydrocarbons, waxes, etc., have been oxidised by the aid of catalysts such as metals, metallic oxides, or salts. In this invention, the reaction is accelerated by employing the catalyst associated with organic nitrogenous bases such as aniline, pyridine, quinoline, butyl-amine, toluidine, or cyclohexylamine. An example is given of the use of a manganese soap associated with hexamethylene-tetramine.

298,714. COBALT CARBONYL, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 28, 1927. Addition to 250,132.

Specification No. 250,132 (see THE CHEMICAL AGE, Vol. XIV, p. 461) describes the production of iron carbonyl by treating iron with carbon monoxide at an increased temperature and a high pressure. The gas is then cooled before release of pressure to condense the carbonyl and prevent its decomposition. This process is now applied to the manufacture of cobalt carbonyl, which is produced at a temperature of 50° C. and pressure of 7·4 atmospheres or at a temperature up to 150—170° C. and pressure of 200 atmospheres. When the cobalt carbonyl is separated by cooling before the release of pressure, the pipes, etc., are maintained at a temperature above 50° C. to prevent the deposition of solid carbonyl in them with resulting obstruction.

298,823. TRANSFORMING INTO A WATER SOLUBLE FORM ORGANIC SUBSTANCES WHICH ARE INSOLUBLE IN WATER. A. L. Mond, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 11, 1928.

Water-insoluble organic substances have been formed into colloidal emulsions with soaps of sulphonated oils and of certain higher alcohols and cyclohexanol in conjunction with soap solutions, but only about 35 per cent. could thus be emulsified. The present process employs mixtures of turkey red oil, potassium ricinoleate and water in conjunction with small amounts of an alkali salt of an alkyl-naphthylene sulphonic acid and paraffin oil. This mixture will take up large quantities of hydrocarbons, chlorinated hydrocarbons, ethereal oils, etc., forming clear solutions which can be diluted with water to any desired extent. An example is given showing that it is possible to obtain a solution containing 82 per cent. of perchlorethylene. The process has a wide application to pharmaceutical and other purposes in that the solvent mixture has no smell, and that it avoids the use of alcohol as a solvent.

298,926. FINELY DIVIDED IRON OXIDE, MANUFACTURE OF. A. Carpmael. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 14, 1927.

Finely divided oxides of trivalent iron are obtained by heating iron hydroxide in the presence of water or an aqueous solution at a temperature of 110°–150° C. and at increased pressure. The mixture to be heated may be obtained by precipitating ferric salt solutions or suspensions with sodium carbonate, lime or chalk. The product consists substantially of iron oxide with only 1–2 per cent. of combined water. The product varies in colour from a yellowish red to a dark violet according to the temperature and time of heating, and the pigments obtained have good covering power.

298,928. BLACK AND GREY VAT DYES. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, and S. Thornley, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, July 15, 1927. Addition to 276,767.

Specification No. 276,767 (see THE CHEMICAL AGE, Vol. XVII, p. 330) describes the production of black and grey vat dyestuffs by alkali fusion of benzanthrone sulphonic acids obtained by the direct sulphonation of benzanthrone as described in Specification No. 276,766 (see THE CHEMICAL AGE, Vol. XVII, p. 330), and treatment of the vat dyes thus obtained with hydroxylamine or a salt in the presence or absence of ferrous sulphate. In this invention a similar treatment is applied to vat dyes obtained by alkali fusion of benzanthrone sulphonic acids obtained by the direct sulphonation of homologues and derivatives of benzanthrone, *e.g.*, methyl and chlorobenzanthrone. Examples are given of the condensation of the alkaline fusion products of sulphonated Bzl-chlorobenzanthrone, sulphonated methyl-benzanthrone, and benzanthrone sulphonic acid with hydroxylamine.

298,931. BENZANTHRONE DERIVATIVES, MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester, J. Baddiley, A. Shepherdson and A. Thornley, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, July 16, 1927. Addition to 276,766.

The direct sulphonation of benzanthrones with high strength sulphuric acid or weak oleum in the presence or absence of mercury catalysts as described in Specification No. 276,766 (see THE CHEMICAL AGE, Vol. XVII, p. 330) is now applied to the sulphonation of simple homologues and derivatives of benzanthrone such as methyl- and chloro-benzanthrone. The sulphonic acid so obtained may be converted into vat dyes by caustic alkali fusion.

299,152. SULPHIDE DYES AND INTERMEDIATE COMPOUNDS. Imperial Chemical Industries, Ltd., Broadway Buildings, London, S.W.1, and R. W. Pope, Dalton Chemical Works, Huddersfield, and M. Wyler, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 8, 1927.

A hydroxylated phenazine, naphthophenazine or dinaphthazine in which there is a free position ortho to at least one hydroxyl group is treated with carbon dioxide and alkali, or with an alkali bicarbonate. The starting material may contain other substituent besides the hydroxyl group, *e.g.*, amino groups. The resulting hydroxylated carboxylated azine can be thionated with an alkali polysulphide in the presence of copper or its compounds to obtain sulphide vat dyes.

299,167. ISOLATION OF PURE HYDROGEN FROM GASEOUS MIXTURES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 29, 1927.

A gaseous mixture of hydrogen, *e.g.*, with methane, is washed with benzines particularly with the lower fraction thereof, at a temperature below 60° C., but above the freezing point of the solvent, at a pressure of about 50 atmospheres. The washing liquid is preferably sprayed into the gas. Impurities such as methane and the higher homologues and substances which may act as catalyst poisons such as ether, carbon monoxide, hydrogen sulphide, or carbon disulphide, can be removed leaving practically pure hydrogen.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—272,864 (Commercial Solvents Corporation) relating to catalytic production of methanol, see Vol. XVII, p. 200; 280,595 (Soc. of Chemical Industry in Basle) relating to dyestuffs, see Vol. XVIII, p. 85; 282,095 (E. Manos) relating to alloys, see Vol. XVIII, p. 23 (Metallurgical Section); 285,064 (Akt.-Ges. für Kohlensaure Industrie and E. B. Auerbach) relating to fractionation of oils, see Vol. XVIII, p. 348; 286,276 (Metallbank and Metallurgische Ges. Akt.-Ges.) relating to manganese bronzes, see Vol. XVIII, p. 47 (Metallurgical Section).

International Specifications not yet Accepted

297,002–3. DYES AND INTERMEDIATES. Soc. of Chemical Industry in Basle, Switzerland. International Convention dates, September 9, and September 10, 1927.

297,002. Benzanthrone is sulphonated with oleum and the sulphonic acid fused with caustic alkali at 255° to 310° C.,

to obtain a vat dye which may be alkylated. Examples are given.

297,003. Soluble diazo and polyazo dyestuffs containing metals, *e.g.*, copper or chromium, are obtained by treating with an agent yielding metal an intermediate dyestuff produced in the course of manufacture, and if necessary treating the finished dyestuff with an agent yielding metal, or by treating the finished dyestuff with an agent yielding more than one metal. Examples are given.

297,029. GUANIDINES. Schering-Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. International Convention date, September 12, 1927.

Dialkyl-cyanamides are treated with an amine salt in the presence of the corresponding free amine to obtain alkylated guanidines.

297,050. SYNTHETIC RUBBER. Goodyear Tyre and Rubber Co,. 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of R. P. Dinsmore, 877, Hereford Drive, Akron, Ohio, U.S.A.) International Convention date, September 13, 1927.

Unsaturated hydrocarbons such as isoprene or dimethyl butadiene are treated with an emulsifying agent such as ammonium or potassium oleate, containing a 2 per cent. solution of casein or egg albumen. The mixture is heated to 50° to 70° C. for six months, and the viscous product treated with acetone or alcohol.

297,051. VULCANISING ACCELERATORS. Goodyear Tyre and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of L. B. Sebrell, R.D.I., Cuyahoga Falls, Ohio, U.S.A.) International Convention date, September 13, 1927.

A mercaptothiazole, *e.g.*, mercapto-benzothiazole is treated with an aldehyde-amine condensation product, *e.g.*, crotonaldehyde-aniline, to obtain a semi-solid which may be hardened by distilling off aniline. The products are vulcanising accelerators.

297,061–2. PURIFYING GASES. C. Still, 4, Bismarckplatz, Recklinghausen, Germany. International Convention date, September 13, 1927.

297,061. Gases containing hydrogen sulphide are purified with a solution of sodium carbonate containing manganese oxide or hydrated oxide, with or without iron oxide or hydrated oxide.

297,062. In a process of the above kind, a soap, saponin, or an extract of peat is added to produce foam.

297,083. CRESOLS. Schering-Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. International Convention date, Septemper 14, 1927.

A mixture of *m*- and *p*-cresol is treated with urea, which forms an addition compound with *m*-cresol. This can be separated in crystalline form and decomposed with water, dilute acids or salts, to obtain *m*-cresol.

297,114. PURIFYING GASES. Kali-industrie Akt.-Ges., C. T. Thorssell, and A. Kristensson, 139, Hohenzollernstrasse, Cassel, Germany. International Convention date, September 16, 1927.

Hydrogen sulphide is removed from gases by treating with a fine suspension of basic ferric chloride in a ferric salt solution, obtained by oxidation of the ferrous salt by nitric acid.

297,116. WHITE LEAD. T. Goldschmidt Akt.-Ges., 18, Salkenbergsweg, Essen, Germany. International Convention date, September 15, 1927.

Colloidal white lead is obtained by treating lead oxide with carbon dioxide in the presence of ammonia as an accelerator.

297,362. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 19, 1927. Addition to 210,081. (See THE CHEMICAL AGE, Vol. X, p. 300.)

Azo dyes are obtained by coupling an arylide of 2:3-oxynaphthoic acid and a diazotized alkyl-, aryl-, or aralkyl-amide of 3-aminobenzoic acid having in the 4-position an alkyloxy-, aryloxy-, or aralkyloxy- group, and in the 6-position an alkyloxy-, aryloxy-, or aralkyloxy-group or halogen. Thus 5-chloro-2-toluidide of 2:3-oxynaphthoic acid is coupled with diazotized anilide of 3-amino-4:6-diethoxybenzoic acid, the product giving a bluish-red shade fast to chlorine. Other examples are given.

297,381. MAGNESIUM CHLORIDE AND HYDROXIDE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 20, 1927.

Dolomite is calcined to convert the magnesium carbonate to oxide, and treated with calcium chloride to obtain magnesium chloride and calcium carbonate. Magnesium hydroxide is precipitated from the chloride by lime or calcined dolomite, yielding calcium chloride for use again.

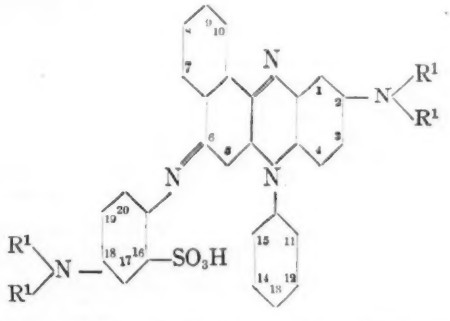
297,385. SYNTHETIC DRUGS. I.G. Farbenindustrie Akt.-

297,416. PHOSPHORUS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 21, 1927.

Specification 285,055 (see THE CHEMICAL AGE, Vol. XVIII, p. 348) describes a process for producing phosphorus, phosphoric acid, and a slag having hydraulic properties. In this invention the charge is a mixture of crude aluminium phosphate and crude calcium phosphate in proportions which yield a slag similar to blast furnace slag.

297,441. DYES. J. R. Geigy Akt.-Ges., 51, Riehenring, Basle, Switzerland. International Convention date, September 21, 1927. Addition to 265,986. (See THE CHEMICAL AGE, Vol. XVI, p. 382.)

Pheno-naphtho-safranine monosulphonic acids having the general formula



in which R represents aralkyl or aryl, and R^1 represents hydrogen, alkyl, aralkyl, or aryl are further sulphonated to obtain acid dyestuffs fast to alkali. In an example, 2-phenyl-naphthyl-amine is coupled with 4-nitroso-1-ethylbenzyl-aniline, sulphonated by alkali sulphite and oxidized to obtain 6-sulpho-3-ethyl-benzyl-isorosinduline. This is coupled with sodium 1-methyl-2-ethylamino-5-amino-4-sulphonate to obtain phenonaphtho-safranine-16-sulphonic acid, which is then sulphonated with fuming sulphuric acid.

LATEST NOTIFICATIONS.

300,246. Continuous process for the manufacture of acetic acid in the anhydrous state from its aqueous solutions. Soc. Anon. des Distilleries des Deux Sevres. November 10, 1927.

300,254. Distillation of fermentation glycerine. Du Pont de Nemours and Co., E. I. November 11, 1927.

300,167. Process for the manufacture of synthetic rubber. I.G. Farbenindustrie Akt.-Ges. November 7, 1927.

300,264. Process for the purification of sulphonic acids, naphthenic acids, and the like. De Bataafsche Petroleum Maatschappij. November 11, 1927.

300,177. Process for the manufacture of urethanes of secondary alcohols. I.G. Farbenindustrie Akt.-Ges. November 7, 1927.

300,178. Process for the manufacture of dyestuffs of the safranine series. I.G. Farbenindustrie Akt.-Ges. November 7, 1927.

300,207. Manufacture of substances resembling cork. I.G. Farbenindustrie Akt.-Ges. November 8, 1927.

300,274. Roll-film spools. I.G. Farbenindustrie Akt.-Ges. November 11, 1927.

300,503. Manufacture of N-oxyethyl derivatives of 4-amino-1-oxybenzene and their application as photographic developers. I.G. Farbenindustrie Akt.-Ges. November 12, 1927.

300,277. Gas-producers. I.G. Farbenindustrie Akt.-Ges. November 10, 1927.

300,208. Process for the vulcanisation of rubber. I.G. Farbenindustrie Akt-Ges. November 8, 1927.

300,279. Process for the manufacture of quinoline indol compounds. I.G. Farbenindustrie Akt.-Ges. November 11, 1927.

300,504. Manufacture of azo dyestuffs. I.G. Farbenindustrie Akt.-Ges. November 12, 1927.

300,282. Manufacture of liquid or solid products by gaseous reaction under the influence of silent electrical discharge. I.G. Farbenindustrie Akt.-Ges. and Carpmael, A. November 11, 1927.

300,508. Photographic film packs. I.G. Farbenindustrie Akt.-Ges. November 10, 1927.

Specifications Accepted with Date of Application

274,128 and 275,613. Azo dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 9 and August 5, 1926. 275,613, addition to 274,128.

275,245. Stable diazo-salt preparations, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 2, 1926.

275,248. Supplying heat in high pressure reactions. I.G. Farbenindustrie Akt.-Ges. July 28, 1926.

276,001. Destructive hydrogenation of carbonaceous materials. I.G. Farbenindustrie Akt.-Ges. August 11, 1926.

280,238. Condensation products from urea, thiourea, or their derivatives, and an alcohol or a ketone, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 6, 1926. Addition to 278,390.

282,782. Dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. December 24, 1926.

282,083. Primary amines, Manufacture of. Fabriques de Produits de Chimie Organique de Laire. December 9, 1926.

288,133. 2-oxy-3:5-di-iodopyridine, Process for the manufacture of. Schering Kahlbaum Akt.-Ges. March 31, 1927.

299,750. Complex minerals containing tin and/or copper, iron, arsenic, sulphur and the like, and associated base and precious metals in combination or otherwise, Treatment of. F. L. Wilder, E. Morris, E. Schiff, and F. S. King. July 30, 1927.

299,796. Ammonium phosphates from mono- or di-calcium phosphate, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) June 29, 1927.

299,797. Pigments and pigment preparation. L. A. Levy and D. W. West. July 1, 1927.

299,820. Low boiling hydrocarbons, Production of. W. Gessmann and E. W. Shalders. June 30, 1927.

299,835. Titanium oxide, Manufacture of. F. G. C. Stephens, L. J. Anderson and W. A. Cash. August 2, 1927.

299,899. Reduction products of vat dyestuffs and other reducible organic compounds, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) May 4, 1927.

299,909. Sulphur dyestuffs, Process for the manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) August 4, 1927.

299,925. Hydrocarbon residues, Treatment of—and the products of such treatment. C. Arnold. (*Standard Development Co.*) August 9, 1927.

299,934. Sulphate of ammonia from gas works liquor or the like, Manufacture of. S. Robson. August 16, 1927.

299,957. Cracking hydrocarbons. C. P. Tolman. September 17, 1927.

299,972. Vat dyestuffs of the anthracene series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) September 30, 1927.

299,984. Mixed crystals containing potassium and ammonium, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 13, 1927.

299,995. Pure caustic soda, Production of. D. A. Pritchard and United Alkali Co., Ltd. October 21, 1927.

300,040. α-hydroxy-carboxylic acids, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 28, 1927.

300,043. Electroplating with chromium or the electrodeposition of chromium. E. V. Hayes-Gratze. January 5, 1928.

300,044. Phosphoric esters of aliphatic alcohols, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) January 12, 1928.

300,078. Aluminium alloy. H. C. Hall and T. F. Bradbury. April 3, 1928.

Applications for Patents

Black, R. Manufacture of organic compounds. 33,121. November 12.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of therapeutical media. 33,192. November 13.

Carpmael A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of organic mercury compounds. 33,464. November 15.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 33,465. November 15.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of water-soluble primary diazoamino compounds, etc. 33,626. November 16.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs insoluble in water. 33,627. November 16.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of ar-tetrahydronaphthols, etc. 33,628. November 16.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs. 33,749. November 17.

Chemical Works, formerly Sandoz. Preparation of anthraquinone vat dyes. 33,817. November 17. (Germany, November 18, 1927.)

Clayton Aniline Co., Ltd. Manufacture of condensation products from aldehydes, etc. 33,057. November 12.

Coley, H. E. Reduction of zinc from ores, etc. 33,599. November 16.

Filtres Philippe. Filter presses. 33,612. November 16. (France, October 10.)

Fritzsche, H. Manufacture of condensation products from aldehydes, etc. 33,057. November 12.

Hansen, C. J. Treatment of thiocyanates. 33,038. November 12. (Germany, May 15.)

Hansen, C. J. Conversion of ammonium thiocyanate, etc., into ammonium sulphate and sulphur. 33,039. November 12. (Germany, July 6.)

Hansen, C. J. Removal of hydrogen sulphide, etc., from gases. 33,451. November 15. (Germany, March 17.)

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of N-dihydro-1 : 2 : 1^1-2^1-anthraquinone-azine, etc. 33,028. November 12.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of organic compounds from aliphatic hydrocarbons. 33,029. November 12.

I.G Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of nitrous oxide from ammonia. 33,030. November 12.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Apparatus for recovery of refined products from carbonaceous materials. 33,031. November 12.

I.G. Farbenindustrie Akt.-Ges, and Johnson, J. Y. Manufacture of azo-dyestuffs. 33,032. November 12.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of halogenated hydrocarbon products, etc. 33,186. November 13. (June 18, 1927.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of oxides of nitrogen. 33,187. November 13.

I.G. Farbenindustrie Akt.-Ges. Manufacture of therapeutical media. 33,192. November 13.

I.G. Farbenindustrie Akt.-Ges. and Imray, O. Y. Manufacture of yellow azo-dyestuffs. 33,241. November 13.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Converting unstable, etc., articles into durable form. 33,323. November 14.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of lacquers, etc. 33,468. November 15.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Cracking oils. 33,606. November 16. (October 3, 1927.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Destructive hydrogenation of carbonaceous materials. 33,607. November 16. (October 3, 1927.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Extraction of oils from carbonaceous materials, etc. 33,608. November 16. (October 3, 1927.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of fertilizers. 33,609. November 16.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of phosphoric acid, etc. 33,610. November 16.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of artificial threads, etc. 33,766. November 17.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Removal from metal powders of impurities. 33,767. November 17.

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of lacquers. 33,768. November 17.

I.G. Farbenindustrie Akt.-Ges. Photographic film-pack. 33,059. November 12. (Germany, November 10, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of nitro-cellulose. 33,060. November 12. (Germany, November 14, 1927.)

I.G. Farbenindustrie Akt.-Ges. Tropical packing for photographic plates, etc. 33,242. November 13. (Germany, September 15.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial threads. 33,243. November 13. (Germany, November 15, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of divinyl and homologues. 33,330. November 14. (Germany, December 9, 1927.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs. 33,331. November 14. (Germany, November 14, 1927.)

I.G. Farbenindustrie Akt.-Ges. Dehydrating vapour mixtures, etc. 33,374. November 14. (Germany, November 14, 1927.)

Imperial Chemical Industries, Ltd. Annealing metal. 33,018. November 12.

Imperial Chemical Industries, Ltd., and Morgan, H. H. Varnishes, etc. 33,223. November 13.

Imperial Chemical Industries, Ltd. Conversion of mineral oils into hydrocarbons. 33,412. November 15.

Imperial Chemical Industries, Ltd. Regulation of pumps, compressers, etc. 33,562. November 16.

Imperial Chemical Industries, Ltd. Thermal decomposition of hydrocarbons. 33,569. November 16.

Imperial Chemical Industries, Ltd., and Morgan, H. H. Treatment of oils, etc. 33,794. November 17.

Imperial Chemical Industries, Ltd. Power presses. 33,795. November 17.

Maclaurin, R. Treating ammonia liquors. 33,127. November 13.

Messerschmitt, A. Decomposition of raw phosphates. 33,101. November 12. (Germany, November 21, 1927.)

Shaw, H., Walker, L. M., and Walker, T. K. Manufacture of organic compounds. 33,121. November 12.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC. 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall., pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised, 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, 2s. per gall. 1929—1s. 11d. per gall.

ACID CRESYLIC 99/100.—2s. 5d. to 3s. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—7¾d. to 8d. per gall. Unstrained, 7¼d. to 7½d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 10½d. per gall.; Standard Motor, 1s. 4d. to 1s. 4½d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 5d. to 1s. 10d. per gall. Firm. Pure, 1s. 10d. to 2s. per gall.

XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

CREOSOTE.—Cresylic, 20/24%, 9d. per gall.; Heavy, 6⅞d. to 7⅛d. per gall. Middle oil, 6¼d. to 6⅜d. per gall. Standard specification, 5⅞d. to 5¾d. per gall. ex works. Salty, 7¼d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent 95/160, 1s. 2d. to 1s. 7d. per gall. Solvent 90/190, 11d. to 1s. 4d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet. Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 37s. 6d. to 42s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 5s. to 6s. 6d. per gall. 90/180, 2s. 3d. to 4s. per gal. Heavy, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100 %.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—2s. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8½d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 10d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £10 5s. per ton. Good demand. Grey, £14 10s. to £15 per ton. Liquor, 9d. per gall.

CHARCOAL.—£6 to £9 per ton, according to grade and locality. Foreign competition severe.

IRON LIQUOR.—1s. 3d. per gall, 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 11d. to 4s. 3d. per gall. Solvent, 4s. 3d. per gall.

WOOD TAR.—£4 to £5 per ton.

BROWN SUGAR OF LEAD.—£40 15s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£2 16s. 10d. to £3 10s. per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity. drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHUR.—11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 7d. to 2s. 8d. per lb.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 6d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts., 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. 0d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—1s. 11d. to 2s. 2d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 3d. per lb., for 28 lb. lots; potassium, 3s. 7d. per lb.; sodium, 3s. 6d. per lb.
IRON AMMONIUM CITRATE.—B.P., 2s. 11d. to 3s. 2d. per lb. Green, 3s. 4d. to 3s. 7d. per lb.; U.S.P., 3s. to 3s. 3d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 1s. 9d. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 23s. 6d. per lb. net; Synthetic, 10s. to 11s. per lb.; Synthetic detached crystals, 10s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph., B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 5d. to 2s. 8d. per lb.
PHENAZONE.—3s. 9d. to 4s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 9d. to 3s. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911—2s. 6d. to 2s. 9d. per lb., B.P.C. 1923—2s. 10d. to 2s. 11d. per lb. U.S.P., 2s. 9d. to 3s. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 4s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 6d. to 1s. 7d. per lb. Crystal, 1s. 7d. to 1s. 8d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—13s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—10s. 6d. per lb.
GERANIOL (PALMAROSA).—20s. per lb.
GERANIOL.—6s. 0d. to 11s. per lb.
HELIOTROPINE.—5s. per lb.
ISO EUGENOL.—16s. per lb.
LINALOL.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol. 10s. 6d. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—45s. per lb.
SAFROL.—1s. 5d. per lb.
TERPINEOL.—1s. 6d. per lb
VANILLIN.—16s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—24s. per lb.
BOURBON GERANIUM OIL.—22s. per lb.
CAMPHOR OIL.—9d. per lb.
CANANGA OIL, JAVA.—12s. per lb.
CINNAMON OIL LEAF.—6s. 6d. per oz.
CASSIA OIL, 80/85%.—7s. per lb.
CITRONELLA OIL.—Java, 2s. 2d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 11d. per lb.
CLOVE OIL (PURE 90/92%).—8s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc, 48/50%, Esters, 16s. 3d. per lb.
LEMON OIL.—16s. 6d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—17s. 3d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—12s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, 15s. 9d. per lb.; Japanese, 9s. 3d. per lb.
PETITGRAIN.—8s. per lb. Sandalwood, Mysore, 28s. per lb., 95% 19s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

November 22, 1928.

THERE has been a fair amount of business passing during the last week and practically no change in prices. A good export inquiry has been maintained.

General Chemicals

ACETONE is unchanged at £75 to £77 10s. per ton, firm and in short supply.

ACETIC ACID is unchanged with a very good demand in all directions.

ACID FORMIC.—£44 per ton for 85% and in good demand.

OXALIC ACID is unchanged at £30 10s. to £32 10s. per ton, firm position.

ACID LACTIC is unchanged at £43 per ton, 50% by weight.

ACID TARTARIC is firm at 1s. 4½d. to 1s. 4¾d. per lb., less 5% prices advancing.

AMMONIUM CHLORIDE is unchanged at about £19 per ton.

ALUMINA SULPHATE is in a very firm position and in short supply. Price about £6 15s. to £7 per ton.

BARIUM CHLORIDE.—The position is very firm and only limited quantities are available even for early next year. Spot price about £11 per ton, ex store.

COPPER SULPHATE is unchanged.

CREAM OF TARTAR at £97 10s. to £100 per ton, less 2½% for B.P. 99/100%.

FORMALDEHYDE remains unchanged at £39 per ton, ex wharf London.

LEAD ACETATE is in good demand at £42 10s. for white; brown £1 per ton less.

LEAD NITRATE.—£36 10s. to £37 per ton.

LIME ACETATE is unchanged.

METHYL ACETONE is unchanged at £58 to £60 per ton for 45%.

POTASSIUM CARBONATE.—£25 to £27 per ton for 96/98%.

POTASSIUM CHLORATE is firm at £28 per ton.

PERMANGANATE POTASH B.P. is firm at 5¼d. to 5½d. per lb.

PRUSSIATE POTASH.—£63 10s. to £65 10s. per ton, is firm and in good demand.

SODIUM ACETATE is firm at £21 10s. to £22 per ton.

SODIUM PRUSSIATE is firm at 4½d. to 5d. per lb.

TARTAR EMETIC.—10¾d. per lb.

ZINC SULPHATE is unchanged at £12 to £13 per ton.

Coal Tar Products

The coal tar product market remains fairly active, and there is little change in prices to report from last week.

MOTOR BENZOL is still scarce, at about 1s. 7d. per gallon, on rails, naked.

SOLVENT NAPHTHA is firm at 1s. 2¼d. per gallon, on rails.

HEAVY NAPHTHA is unchanged at 1s. 1d. to 1s. 1½d. per gallon, on rails.

CREOSOTE OIL is firm, at 5½d. per gallon, on rails, in the North, to the end of the year, and at 6d. per gallon in London.

CRESYLIC ACID is unchanged, the 98/100% quality being quoted at about 2s. 2d. per gallon, f.o.b., and the dark quality, 95/97%, at 1s. 10d. per gallon f.o.b., naked.

NAPHTHALENE remains firm, at £5 per ton, for the 74/76 quality, and £6 to £6 10s. per ton, for the 76/78 quality.

PITCH is unchanged at 40s. to 45s. per ton, f.o.b. U.K. port.

Nitrogen Products

SULPHATE OF AMMONIA.—The demand from abroad still continues to be somewhat quiet, but this is only to be expected at this time of the year, and as large orders have been placed little further demand can come in for some time. The prices are still very firm and remain unchanged. With regard to the home trade position there is nothing fresh to report.

NITRATE OF SODA.—The market continues firm and it is reported that more enquiries have been experienced lately, and sales for next spring again show signs of increasing.

Latest Oil Prices

LONDON, November 21.—LINSEED OIL was firm and occasionally 2s. 6d. per ton higher. Spot, ex mill, £30 15s.; December and January, £29 10s.; January-April, £29 2s. 6d.; May-August, £29; and September-December, £29 12s. 6d., naked. RAPE OIL was quiet. Crude extracted, £40 10s.; and technical refined, £42 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £30 10s.; refined common edible, £36; and deodorised, £38 naked, ex mill. TURPENTINE was inactive and 3d. lower. American spot, 47s.; December, 47s. 3d.; and January-April, 47s. 9d. per cwt.

HULL, November 21.—LINSEED OIL.—Spot to December, £29 10s.; January-April and May-August, £29 5s. per ton, naked. COTTON OIL.—Bombay crude, spot, £29 10s.; Egyptian crude, spot, and November-February, £30; edible, refined, spot and November-February, £33 15s.; technical, spot, £33 5s.; deodorised, spot, £35 15s. per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £37 15s. per ton, naked. GROUNDNUT OIL.—Crushed extracted, £37 10s.; deodorised, £41 10s. per ton. SOYA OIL.—Extracted and crushed, £33; deodorised, £36 10s. per ton. RAPE OIL.—Crude extracted, £40 15s.; refined, £42 15s. per ton, net cash terms, ex-mill. TURPENTINE, CASTOR OIL and COD OIL.—Unchanged.

South Wales By-Products

SOUTH Wales by-product activities are unchanged. Business generally is slightly better than it has been for some considerable time, but there is a big leeway to be made up before anything approaching normality is reached. Pitch, the demand for which has fallen, is not so firm and has been changing hands round 37s. 6d. to 42s. 6d. per ton, prompt delivery. Crude remains firm at 50s. per ton, makers' works, and there is a steady, if moderate, demand. Crude naphthalene is steady round 80s. to 85s. per ton, while a similar remark applies to whizzed at 100s. per ton. Refined tars are not so good, and values have weakened, gasworks tar changing hands round about 6¼d. to 7d. per gallon delivered, and coke oven tar at from 7d. to 7¾d. per gallon delivered. Patent fuel and coke exports continue to increase, but values are unchanged. Patent fuel, ex-ship Swansea, continues to sell at from 19s. 6d. to 19s. 9d. per ton; ex-ship Cardiff, 20s. to 21s. per ton. Coke quotations are unchanged as follows: Furnace, 20s. to 21s. per ton; foundry, 25s. to 36s. 6d. per ton; furnace, at ovens, 19s. to 20s. per ton; foundry, at ovens, 27s. 6d. to 33s. per ton.

Chemical Engineers' Conference on "Drying"

THE completed arrangements for the conference on "Drying" to be held by the Institution of Chemical Engineers, are now announced. The conference, which covers a varied number of subjects, will be held in the Chemical Society's Rooms, Burlington House, London, on Thursday and Friday, December 6 and 7. Sessions will be held at 10.30 a.m. and at 2.30 p.m. on each day.

On Thursday morning the conference will open with papers on "The Seasoning or Drying of Timber," by Mr. S. T. C. Stillwell, of the Forest Products Research Laboratory, and "Tunnel and Stove Drying," by A. T. Henly. The afternoon papers will be read on "Film and Spray Drying," by Mr. J. Arthur Reavell, and "Drying by Pressure," by Professor J. W. Hinchley.

On Friday morning, Mr. T. J. Horgan will present a paper on "Rotary Dryers," and Mr. G. W. Riley one on "Vacuum Drying." The conference will conclude on Friday afternoon with papers on "The Hygroscopic Nature of Textile Fibres," by Dr. S. G. Barker, Director of the British Research Association for the Woollen and Worsted Industries, "The Drying of Agricultural Products," by Captain B. J. Owen, of the Institute of Agricultural Engineering, and "Some Drying Problems in Tropical Africa," by Mr. A. Chapman Barnes, of the Department of Agriculture, Zanzibar. A programme giving the full particulars may be obtained from the honorary secretary of the Institution, Abbey House, Westminster, London, S.W.1.

Radium Springs

RADIUM SPRINGS, LTD., has been registered as a public company with a capital of £500,000 in 800,000 8 per cent. participating preferred ordinary shares of 10s. each and 2,000,000 deferred shares of 1s. each. Underwriting arrangements are now being completed, and an issue will shortly be made of 400,000 of the participating preferred ordinary and 400,000 of the deferred shares, both at par.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, November 21, 1928.

THERE has been a slight improvement in the amount of business in heavy chemicals during the past week and export inquiry has, particularly, been much larger. Prices remain practically unchanged. There are indications of little or no changes in prices of heavy alkali chemicals for next year, the prices for sodium sulphide and hyposulphite of soda being already advised as unchanged.

Industrial Chemicals

ACETONE, B.G.S.—Nominally £74 10s. to £77 10s. per ton, ex wharf according to quantity, but very little available for immediate delivery.

ACID ACETIC, 98/100%.—Glacial £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes £30 per ton. Powder £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In rather good demand and now quoted 6¾d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Rather easier and now offered at 2s. 6¼d. per lb., less 5%, ex wharf, prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80°.—Quality £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf. Spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5%, ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports. Spot material quoted £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Crystal meal quoted £8 10s. per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 9½d. per lb. carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump £37 per ton. Powdered £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID. 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanizers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals, offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE, 98/100%.—On offer for prompt shipment from China at £39 10s. per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf prompt despatch from mines. Spot material on offer at, £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Quoted £9 15s. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Spot material on offer at £11 per ton, ex wharf.

BLEACHING POWDER.—British manufacturers' contract price to consumers £6 12s. 6d. per ton delivered, minimum 4 ton lots. Continental on offer at £6 10s. per ton, ex wharf.

CALCIUM CHLORIDE.—British manufacturers' price £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports, for export.

COPPER SULPHATE.—Still in good demand and price advanced to about £25 per ton, ex wharf.

FORMALDEHYDE, 40%.—Firmer offered for prompt shipment c.i.f. U.K. ports at £37 per ton. Spot material quoted £38 10s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—On offer at £29 10s. per ton, ex store.

LEAD, WHITE.—Quoted £37, per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 per ton, ex store. Brown on offer at about £31 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—4½d. per lb., delivered, minimum 4-ton lots. Under 4-ton lots ⅛d. per lb. extra.

POTASSIUM CARBONATE, 96/98%.—Offered from the Continent at £25 per ton, c.i.f. U.K. ports. Spot material available at £26 per ton, ex store.

POTASSIUM CHLORATE, 99¾/100%, POWDER.—Quoted £22 15s. per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 6⅝d. per lb., ex store. Offered from the Continent at 6½d. per lb., ex wharf, prompt shipment.

SODA CAUSTIC.—Powdered, 98/99%, £17 17s. 6d. per ton; solid, 76/77%, £14 10s. per ton; and 70/72%, £13 12s. 6d. per ton, minimum 4-ton lots, carriage paid on contract. Spot material 10s. per ton extra.

SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3d. per lb., delivered buyer's works, minimum 4-ton lots. Under 4 and over 2 ton lots 1/16d. per lb. extra. Under 2-ton lots, 3⅛d. per lb.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 3s. 9d. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for next year unchanged.

SODIUM NITRATE.—Quoted £10 4s. per ton, carriage paid buyer's station, for ordinary quality. Refined quality 2s. 6d. per ton extra.

SODIUM PRUSSIATE.—Spot material on offer at 4⅞d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid, 60/62%, £9 per ton; broken, 60/62%, £10 per ton; crystals, 30/32%, £7 2s. 6d. per ton, delivered buyer's works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra. Prices for next year unchanged.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Inquiry into Exports Credits Guarantee Scheme

IN accordance with the announcement made by the Prime Minister towards the close of the last Parliamentary session, Mr. Douglas Hacking, M.P., secretary of the Department of Overseas Trade, has, with the approval of the President of the Board of Trade, appointed the following committee to inquire into the administrative expenses of the Export Credits Guarantee Scheme and other matters related thereto:—Sir Otto Niemeyer (chairman), Col. the Honourable Sidney Peel, and Sir William Plender. The committee's terms of reference are as follows:—"To consider generally the administration of the Export Credits Guarantee Scheme in the light of the recommendations of the select committee on estimates on the Export Credits Guarantee Department, and to recommend what changes, if any, are necessary in the present system of administration and the presentation of the accounts and to suggest any changes in the general working of the scheme which are likely to facilitate final transference of the business from Government control." The secretary to the committee will be Mr. E. J. Holford-Strevens, of the Export Credits Guarantee Department, 9, Clements Lane, Lombard Street, London, E.C.4.

Manchester Chemical Market

(From Our Own Correspondent).

Manchester, November 22, 1928.

Signs of improved conditions in certain of the Lancashire cotton mill towns raises the hope that the effect will be felt before long in the chemical trade which, in this part of the country, has long awaited an improvement in this direction. Much, of course, depends upon whether such an improvement is of a stable character or merely "a flash in the pan," one of many, by the way, to arouse false hopes in the past. Demand for chemicals this week has only been on comparatively moderate lines but, taking the range of products generally, prices keep remarkably steady.

Heavy Chemicals

There has been a quiet business passing in hyposulphite of soda, offers of which are at £15 5s. to £15 10s. per ton for the photographic kind and about £9 for the commercial. Bleaching powder is moving in moderate quantities, chiefly against contracts, with current quotations at round £6 15s per ton. Phosphate of soda is fully maintained at up to £12 10s. per ton, though only a quiet trade is being done in this section. With regard to chlorate of soda, buying interest in this material is rather inactive, but prices are unchanged at 2⅞d. per lb. Saltcake, also, is held at about £2 12s. 6d. per ton but, here again, business has been slow. There is a fair demand about for caustic soda and values are firm at from £13 7s. 6d. to £15 7s. 6d. per ton, according to grade. Sulphide of sodium meets with a rather poor inquiry at the moment, with commercial quality material quoted at round £8 per ton and the 60-65 per cent. concentrated solid at about £9 10s. There is a fair movement in the case of prussiate of soda and prices are fully maintained at from 4½d. to 5½d. per lb., according to quantity. Alkali and bicarbonate of soda are both in quietly steady demand, with offers still at round £6 2s. 6d. and £10 10s. per ton, respectively. There is a continued steady tone about in the bichromate of soda section, a moderate business in which is going through at round 3d. per lb.

Among the potash products, permanganate is in somewhat quiet request but without any quotable change in the price position, B.P. quality being offered at about 5½d. per lb. and commercial at 5d. Carbonate of potash is very steady at £26 5s. per ton, and a moderate business in this material is going through. Caustic potash meets with some inquiry, with current offers at from £33 5s. per ton for prompt delivery of one to five-ton lots. Chlorate of potash is on the quiet side, and at from 2¾d. to 3d. per lb. values are not too strong. Bichromate of potash is about unchanged on the week at round 4d. per lb., and a fair trade has been reported during the past week. Yellow prussiate of potash is in moderate request at from 6¾d. to 7¼d. per lb., according to quantity.

Only a comparatively quiet business is passing just now in arsenic, and the tendency of prices is easy at round £16 10s. per ton at the mines, for white powdered, Cornish makes. Sulphate of copper continues to display firmness, and a fair demand is being met with at from £26 10s. to £26 15s. per ton. There has been little further change in the price position of the acetates of lime, a limited inquiry being reported at £9 per ton for the brown quality and £16 5s. for the grey. The acetates of lead are slow and easy at about £39 10s. per ton for the white and £38 to £38 10s. for the brown, with nitrate of lead rather slow at £35.

Acids and Tar Products

Citric acid is in fair request at the lower range of 2s. 5d. to 2s. 6d. per lb. With regard to tartaric acid, this is selling in moderate quantities and prices are steady at from 1s. 4d. to 1s. 4¼d. per lb. Oxalic acid is still on the quiet side, with current offers at about 3¾d. per lb. There is a quietly steady call for acetic acid, and values are held at round £36 per ton for the 80 per cent. commercial grade and £66 to £67 for the glacial.

Pitch remains very inactive on the by-products market, with quotations more or less nominal at £1 17s. 6d. per ton, f.o.b. There has been little change in the price position of creosote oil, a quiet trade in which is being put through on the basis of 5¾d. per gallon, naked. Carbolic acid crystals are steady and in fair request at about 6¼d. per lb., with crude material still on offer at from 1s. 11d. to 2s. per gallon. A moderate business is being done in solvent naphtha, quotations for which are steady in the neighbourhood of 1s. 1½d. per gallon.

Protection Against Poisonous Sprays

An American Investigation

Surgeon-General H. S. Cumming, of the United States Public Health Service, has recently announced (Public Health Bulletin No. 177) the results of an investigation undertaken at the request of a committee appointed by the United States National Safety Council. This investigation was made by the United States Bureau of Mines and the National Safety Council, in co-operation with the United States Public Health Service, to determine the value of respirators as a means of protection from the hazard of spray painting resulting from exposure to lead, benzol, and silica. The specific questions proposed by the National Safety Council to be answered were as follows:—

1. What filtering material, if any, is adequate? (*a*) To reduce the lead content of the air to which a spray coater is exposed from 200 milligrams per cubic meter to 0·6 milligram per cubic meter? (*b*) To reduce the amount of benzol under similar conditions from 2,000 to 75 parts per million? (*c*) To reduce the number of silica particles under similar conditions from 200,000,000 to 100,000 per cubic meter as determined by the Palmer method?
2. How long would such a layer function?
3. How do certain typical masks, now available, measure up to this standard?

The concentrations stated above for lead and benzol should not be construed as being those to which spray painters are commonly exposed. They represent more nearly the high concentrations which can quickly cause sickness and are to be considered as extremes. It is stated, as a result of the tests, that in general, the respirators with cotton, paper, or fabric filters remove 90 per cent. or more of the lead from air carrying paint mist. These respirators restrain none of the solvent vapours, however; but the addition of a canister or cartridge of activated charcoal to the respirator removes all solvent vapours until the charcoal becomes saturated.

The useful life of filters is determined by their increase in resistance, which necessitates changing for fresh filters at intervals of several hours. When charcoal is saturated, the cartridge must be exchanged for a fresh one. Canisters of the size used with gas masks may last for weeks before a change is necessary. The respirators were somewhat less efficient against the silica dust sprays, but they restrained 24 per cent. or more of the dust from the air passed through them; most of them were more than 50 per cent. efficient.

British Industries Fair

Great Increase in Numbers of Overseas Buyers

An increase of over 300 per cent. in the number of overseas buyers who have promised to attend the next British Industries Fair was revealed this week by Mr. Douglas Hacking, M.P., Minister of the Department of Overseas Trade, as a result of a comparison made with the replies received up to the corresponding date last year.

"In a single batch of replies to the Government's invitation which one of my officers brought me," said Mr. Hacking, "I was astonished to find that there were only two refusals. The rest were definite promises to come to the Fair, except two, in which the writers said that they hoped to come should circumstances permit. I asked whether this was an exceptional case. The reply was that during the previous three days we had received mails from Holland, France, Belgium, and Italy which showed large numbers of visitors who have promised to attend. Similar mails are being received almost daily. There is also a 100 per cent. increase in the number of replies stating that the United Kingdom agents of overseas firms have been instructed to attend the Fair. In addition there is a very large all-round increase in the total number of replies received, which shows that our campaign is 'getting home,' so to speak, while the proportion of acceptances of our invitation as against refusals is not merely rising from year to year; it is positively jumping ahead."

The Fair is to be held at White City, London, and Castle Bromwich, Birmingham, from February 18 to March 1.

Company News

INTERNATIONAL PETROLEUM CO.—A dividend of 25 cents, U.S. currency, per share, equivalent at par of exchange to 1s. 0½d. per share, has been declared.

A. B. FLEMING AND CO., LTD.—An interim dividend of 5 per cent., less tax, is announced, payable on November 21. It is stated that the directors propose to increase the capital of the company from £150,000 to £300,000 by the creation of 150,000 new £1 ordinary shares.

NEW TRANSVAAL CHEMICAL CO.—The balance standing to the credit of profit and loss account, for the year ended June 30, 1928, is £65,874, which includes £9,650 brought forward. The directors recommend the payment of the remuneration of the board, £630, and a dividend of 12½ per, cent. on the ordinary shares, carrying forward £9,995.

ILFORD, LTD.—The net profit for the year ended October 31 last is £119,891, as compared with £76,473 last year. This amount, with £9,222 brought forward from last year, gives £129,113 for appropriation. The directors have written £5,000 off goodwill and transferred £30,700 to reserve fund, and recommend a final dividend of 7½ per cent., making 12½ per cent. for the year on the ordinary shares, carrying forward £10,238.

WEARDALE LEAD CO.—For the twelve months ended September 30, 1928, the report shows a profit, including income from investments, of £13,944. After writing down property plant and machinery account by £3,588, the total amount to be dealt with, including the balance brought forward, is £15,743. The directors recommend a final dividend of 1s. 6d. per share (making the interim dividend already paid, 10 per cent. for the year), carrying forward £5,951.

CHESHIRE UNITED SALT CO.—In a progress report to the shareholders, the directors of the Cheshire United Salt Co. state that the output of salt for October constituted a record for the company. The realised profits amounted to £723, the results having been affected by the lower prices ruling owing to the breaking up of the Salt Association. This, it is stated, was to be expected, pending the formation of the merger of salt manufacturers which is now being negotiated. Meanwhile, the company is proceeding with the installation of additional plant.

LANGDALE'S CHEMICAL MANURE.—The report states that there was a loss for the year ended September 30, 1928, of £3,259, from which must be deducted the balance of profit brought forward of £425, making a total loss to be carried forward of £2,834. The disastrous summer of 1927 is stated to have caused considerable restriction in the purchase of manures, resulting in a falling-off in tonnage output during the ensuing autumn and spring. Prices were sharply cut by keen competition to secure orders without any reduction in cost of production. After the better agricultural season in 1928, the prospects of the coming year are rather brighter, and there is hope that continental competition in home trade will be somewhat modified.

Benn Brothers' Other Journals

THE CABINET MAKER.—Les Sembliers; The Clothes Moth Problem; D.I.A. Annual Dinner; High Wycombe Exhibition; Modern Art at Waring and Gillows.

THE ELECTRICIAN.—Modern Lighting Designs; A.C. versus D.C. Distribution; Report of the Annual Dinner of the Electrical Trades' Benevolent Institution.

THE FRUIT GROWER.—Spitalfields Market Extension; Details of the Opening Ceremony; Fruit Freights and Producers; Covent Garden Properties Report.

GARDENING ILLUSTRATED.—Rhododendrons to Plant Now; Lilies for November Planting; A Selection of Border Chrysanthemums; Pruning Young Fruit Trees.

THE GAS WORLD.—Gas Holder Sheeting; A Review of the Technical Press for Gas Salesmen; Improving the Efficiency of Gas Producers.

THE HARDWARE TRADE JOURNAL.—Outstanding Features of the Ironmongery Hardware and Domestic Appliances Exhibition in London; Standardisation and Hardware Retailers; The Radio Counter.

THE TIMBER TRADES JOURNAL.—"Imported Softwoods," by Montague L. Meyer; Forestry in Sweden; Costs in Arbitration; Working Plans in Forestry; The Royal Arboricultural Society; Sawmill: Efficient Equipment.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C 2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to December 7, 1928.

FERTOTERRE.

495,660. Class 2. Fertilisers. The Basic Slag and Phosphate Co., Ltd., 67, Queen Victoria Street, London, E.C.4; chemical manufacturers.—October 4, 1928.

SURPRISE.

495,341. Class 1. Water softening preparations. Wm. Edge and Sons, Ltd., 50, Raphael Street, Bolton, Lancashire; manufacturing chemists and dye merchants.—September 26, 1928.

Opposition to the Registration of the following Trade Marks can be lodged up to December 14, 1928.

AROSOL.

494,892. Class 1. Chemical substances for use in the manufacture of perfumes. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers.—September 11, 1928.

HYDETTE.

495,194. Class 1. Colours, paints, enamels, distempers, white lead and white lead substitutes. Sir W. A. Rose and Co., Ltd., 161, Cheapside, London, E.C.2; manufacturers.—September 20, 1928.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal" have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

MEDICAL AND PHARMACEUTICAL CHEMICALS.—The Director of Government Medical Supplies is inviting tenders to be received in Amsterdam by December 3, 1928, for the supply of medicinal preparations to the Department of Defence and the Ministry of Colonies during the year 1929. The two contracts in question involve a wide range of supplies, including acetic, boric, sulphuric and other acids, liquid ammonia, Peruvian balsam, glycerine, gum arabic, pumice powder, seed oils, soft soap, calico, lint, wadding, wood wool, packings, and chamois leather. (Reference E.X. 4,896.)

CREOSOTE.—The Town Council of Johannesburg is calling for tenders, to be presented in South Africa by November 22, 1928, for the supply of 120 tons (1 ton = 2,000 lbs.) of creosote. (Reference B.X. 4858.)

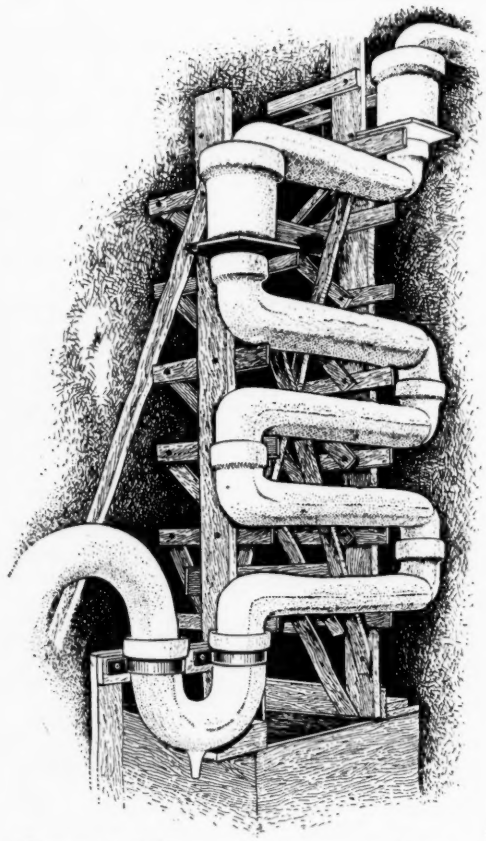
CHINA CLAY.—An American firm manufacturing chinaware and porcelain are desirous of securing the representation of British manufacturers of china clay. The firm maintains an organisation capable of covering the western region of the United States. (Ref. No. 414.)

"BIRMINGHAM COMMERCIALLY CONSIDERED" is the title of a very handsome illustrated volume issued by the Corporation of Birmingham in order to draw attention to the commercial position, developments, and future of the city.

KRUPPS A.-G. are concerned in two agreements which have recently been signed. One of these is with the G.E.C. of New York, under which the American company takes over the U.S. rights in the Carboli steel process, and the other agreement is with the Ludlum Steel Co. for the exploitation of certain patents.

A REPORT on experiments with sulphite-cellulose lye for sole leather tanning was read by Mr. Al. Zhemotchkin at a recent meeting of the Soviet Leather Syndicate. Results appear to be satisfactory. As the lye, which is a waste product of papermaking, costs very little it should find wide application in the leather industry.

The "VITREOSIL"



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THESE VESSELS set up Vertically one above the other can be thoroughly Water Cooled.

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ABC Code, 5th & 6th Editions, & Bentley's used

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Deed of Arrangement

[*The following deeds of arrangement with creditors have been filed under the Deeds of Arrangement Act, 1914. Under this Act it is necessary that private arrangements other than those executed in pursuance of the Bankruptcy Act shall be registered within seven clear days after the first execution by the debtor or any creditor. These figures are taken from the affidavit filed with the registered deed, but may be subject to variation on realisation.*]

ROBERTSON, John Grant, trading as YORKSHIRE PACKING CO., Grange Street, and residing at 62, Grafton Road, Keighley, wholesale druggist. (D.A., 24/11/28.) Dated November 16, filed November 19. Trustee, W. Sunderland (of Lee and Mitchell), Craven Bank Chambers, Keighley, I.A. Secured creditors, £54; liabilities unsecured, £428; assets, less secured claims, £159.

London Gazette, &c.

Reduction of Capital

CROSS (ALEXANDER) AND SONS, LTD. (R.C., 24/11/28.) The company has presented a petition to the Court for an order confirming the reduction of the capital resolved on by the following special resolution at an extraordinary general meeting held on October 29 and confirmed at a subsequent extraordinary general meeting held on November 13:—That the capital of the Company be reduced from £350,000 divided into 40,000 shares of £8 15s. each fully paid up to £266,000 divided into 40,000 shares of £6 13s. each fully paid up, and that such reduction be effected by returning to the shareholders paid up capital to the extent of £2 2s. per share by (1) the transfer of fully paid shares of £1 each in Alexander Cross Seed Company, Ltd., to the Shareholders of the Company in the proportion of seven such shares for every four shares held in the Company, the said shares being transferred being deemed to be of par value, and (2) the payment of 7s. in cash to the shareholders of the company in respect of each share held by them, and by reducing the nominal amount of each of the shares of the Company from £8 15s. to £6 13s.

Partnership Dissolved

ALFRED SMETHAM (Frederick Robertson DODD and the late Alfred SMETHAM), analytical chemists, 59, Victoria Street, Liverpool, as from October 11, 1928, by reason of the death of A. Smetham on that date. Debts received and paid by F. R. Dodd, who will carry on the business.

New Companies Registered

BRITISH GLASURIT, LTD. Registered November 15. Nominal capital, £15,000 in £1 shares. Manufacturers of high-class varnishes, enamels, and japans carried on by Glasurit-Werke M. Winkelmann Aktiegesellschaft, at Tudor Works, Abbey Road, Park Royal, London, N.W.10, together with benefit of a registered trade mark relating to paints dry and mixed, lacquers, varnishes, mordants, cements, and preparations for the preserving of metal, wood, and stone, and known as "Glasurit," and numbered B.464,078 in Class 1. A subscriber: A. W. Bird, 3/4, Clements Inn, Strand, London, W.C.2.

Birmingham's New Super Power Station

IF the progress already made is maintained, as is almost certain, the new super power station at Hams Hall, near Birmingham, will probably create a record. According to Mr. R. A. Chattock, the city electrical engineer, the original idea of completion in twenty months is well in sight. It will be recalled that the order for this station was the largest single contract ever placed as one order, International Combustion, Ltd., being the main contractors. Pulverised fuel firing, which has come so prominently to the front in large modern power stations, will be used for raising the steam for driving the turbo-generators, and the plant will embody the latest patent design of "Lopulco" combustion chamber, lined with Murray fire tubes, the contractors' latest "R" type turbulent burners, large "Usco" air heaters, and other auxiliaries for obtaining the best efficiency. Pulverisers for the fuel will be supplied by Alfred Herbert and Co., Ltd., draught plant and dust collectors by Davidson and Co., Ltd., ash sluicing plant by Underfeed Stoker Co., Ltd., raw-coal handling plant by the Mitchell Conveyor and Transport Co., Ltd., and the pressure parts of the boilers by Babcock and Wilcox, Ltd. The turbines are being made by Fraser and Chalmers, Ltd., and the General Electric Co. will supply the electricity generating plant. When completed, the station will represent a notable achievement in British power plant construction, both as regards its equipment and the remarkably short time involved from commencement to completion.

Advances in Beet Sugar Manufacture

Paper before S.C.I. at Birmingham

THE first meeting of the session of the Birmingham and Midland Section of the Society of Chemical Industry was held on Tuesday, November 13, at the Birmingham Chamber of Commerce. Mr. G. King (hon. secretary) announced the election of the committee as follows: Professor A. R. Ling, Drs. C. A. Fox, E. D. Mason, W. M. Hampton, W. Wardlaw, and Messrs. A. W. Knapp, W. R. Barclay, W. Dickson, T. C. Humphreys, J. R. Johnson, H. W. Rowell and W. Salmon, with W. T. Collis (hon. secretary), and A. J. Broughall (Chemical Engineering Group representative). The chairman this year is Mr. W. A. S. Calder, and the vice-chairmen are Mr. J. C. Mann, Dr. H. W. Brownsdon, and Mr. W. A. Benton. Future arrangements announced include a paper on "Developments of Dried Milk Industry with Special Reference to Spray Drying," by Dr. L. H. Lampitt, on December 13, and a joint meeting with the Chemical Engineering Group on April 12.

Mr. Lane's Paper

Mr. J. H. Lane (of Eynon and Lane), official analyst to the Sugar Association, read a paper on "Recent Developments in Beet Sugar Manufacture." The improvement which the manufacture of beet sugar had undergone during the past fifty years had, said the author, been due in the first place to a steady improvement in the quality of the sugar-beet, which now contained about three times as much sugar as that of a hundred years ago, and in the second place to improved factory equipment and control.

Before the war the great majority of beet sugar factories produced only raw beet sugar (which was unfit for direct consumption), and sold it to refineries for conversion into white refined sugar. At the present time a large number, including most of the new English factories, had adopted the practice of producing white sugar for direct consumption themselves, by modifying or supplementing the usual operations. That practice certainly represented the most striking of the post-war tendencies in beet sugar manufacture. The factory white sugars usually did not command so high a price as the best refinery products, but many of them were scarcely distinguishable from refined sugars, although others had a tendency to become "off colour."

The Drying of Beet

A subject which had aroused widespread interest was the attempt now being made to establish a system of sugar manufacture according to which the fresh beets were sliced and dried so that they could be stored as long as required without any loss of sugar, and transported cheaply, as they had only a quarter of the weight of fresh cossettes. It was claimed that factories might thus be supplied with dried cossettes from a wide beet growing area, continuing to work all the year, instead of for three months only. More than fifty years ago a system of this kind was operated by several continental factories for a time, but eventually given up. The chief stumbling block was the cost of drying and storing the cossettes, but there were counter-advantages which made the process rather attractive.

For the past five years it had been operated on a somewhat limited factory scale in Italy by Dr. De Vecchis, who employed a special method of drying which, he claimed, facilitated the subsequent recovery of the sugar. In this country, factory operations, also of a limited kind, were being carried out at Eynsham by Dr. Owen, who investigated the De Vecchis process on behalf of the Ministry of Agriculture and Fisheries, and who had adopted different conditions of drying from those employed by De Vecchis.